Methods for Teaching Environmental Law: Some Thoughts on Providing Access to the Environmental Law System

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I. INTRODUCTION

Environmental law has seen remarkable growth in the past 30 years. From the passage of the original Clean Air Act in 1970, to the present in which the current Administration has established interests in the environment, environmental law practice has expanded exponentially. In the 1990s environmental law was declared "hyper-hot" and "erupting in importance." While generally concluding that a career in law is not a good option for graduating college students, a major news magazine heralded environmental law as a "hot field." In the early 1990s, the National Law Journal...
declared environmental law an "in" specialty and found that there had been a "boom" in its practice. Recently, however, it appears to be a bit less "in". Even so, in the 250 largest American law firms, environmental law has been one of the fastest growing specialties in the last decade. In recent years the number of law students opting for courses and careers in environmental law has increased dramatically.

Unfortunately, students entering the field of environmental law have little understanding about what environmental law is and what environmental lawyers do. A survey both of law students interested in environmental law and environmental lawyers showed that students and lawyers felt ill-prepared upon leaving law school to practice environmental law.

Environmental law professors agree that academic instruction in environmental law has been ineffective. Instruction in environmental law has not provided students sufficient understanding of the complex systems that form the bulk of environmental law. Environmental law includes federal and state statutes, administrative regulations and administrative guidance in the form of policy and


7. Mary Cronin Fisk, All That Timidity in the Early 90's Has Created Opportunities Now, NAT'L L.J., Aug. 19, 1996, at C1 (stating that only bankruptcy and environmental law, hot areas in recent years, appear to be way down in most, though not all areas of the country.) See also Darryl Van Duch, Consultant: M&A, IP Practices Are Hot, Real Estate and Insurance Defense Lag, Says a Survey, NAT'L. L.J., Feb. 3, 1997, at A13 (stating that cold practice areas in 1997 will include environmental law).

8. Wakefield, supra note 6 at 169.


10. Wakefield, supra note 6. Assuming that the students, now lawyers, interest in environmental law was not sincere, Wakefield's study sought to determine whether environmental lawyers find the practice of environmental law to be fulfilling, and whether environmental law is likely to meet law students' needs and expectations.

11. Wakefield, supra note 6, at 191 (finding that academic instruction in environmental law has not been effective).

agency decisions, in addition to judicial decisions. Improved instruction of environmental law must reflect all of these aspects. However, "[r]ather than examining their own teaching methods, some professors place the blame on ineffective environmental laws." Environmental statutes certainly are complex, and the labyrinth of regulations they have spawned is even more so. Beginning in the late 1960s, federal and state governments have created a body of law that is "epic in its size and scope and Talmudic in its complexity." In fact, the sheer volume of material makes it impossible for any professor, even one using the best of methods, to teach the diverse, distinct, and overlapping universe of substance the subject provides.

Students, however, disagree with the assertion that the fault lies in the complexity of statutes, and instead believe that "if law students leave school unprepared to practice environmental law, it is partly due to an antiquated and ineffective method of instruction. Environmental law cannot be taught using the case method . . . ." Students believe, and I must agree, that use of the traditional case method of instruction as a primary approach to teaching a highly technical, largely statutory body of law is inadequate to prepare students for a career in environmental law.

A 1944 Association of American Law Schools' Report of the Curriculum Committee, found the case method failing under the weight of "a constant accession of new and more complex materials and new and more complex demands which are made upon all case-courses at once and indiscriminately." "The Report concluded that the continued analysis of appellate cases is not useful to train lawyers in the skills of statutory construction . . . ." This is especially true with respect to environmental law courses because

13. Wakefield, supra note 6, at 191.
15. Wakefield, supra note 6, at 192 & nn. 64, 65.
17. Tarlock, supra note 16.
much of environmental law is not in appellate opinions and sometime during their legal education, students must learn to handle non-appellate law.\textsuperscript{18} Assuming the traditional case method is not an effective means for teaching environmental law, environmental law professors must find better teaching methods. Understandably, some environmental law professors have become discouraged.\textsuperscript{19} Many feel that "[t]he subject has overwhelmed [them]. Virtually every law teacher . . . wants to introduce students to the specific material in the field, and to provide some experience with statutes and familiarity with it. Yet, every such attempt is an encounter with statutes of numbing complexity and detail . . . ."\textsuperscript{20} Nevertheless, there are some environmental law professors who are working hard to meet the needs of students in this field.\textsuperscript{21}

This article surveys teaching methods that could improve the effectiveness of environmental legal education. I propose that approaches to teaching environmental law be viewed in two ways; first, as a substantive course in which students gain access to a complex system of law, and second, as a substantive base for teaching students skills of legal process. Within both possibilities, I focus on the value of teaching students to understand the environmental law system.\textsuperscript{22} Instructors can introduce students to the environmental law system by looking at a few of the major federal environmental statutes in relative depth,\textsuperscript{23} or as they apply to specific

\textsuperscript{18} See comments of David P. Currie, in LAW AND THE ENVIRONMENT, supra note 16, at 339.
\textsuperscript{19} Sax, supra note 12. According to a more recent study by Robert V. Percival, environmental law professors are more upbeat today. Percival found that most of the fundamental factors contributing to Sax's pessimism have not disappeared and attributes the change, in part, to the field's unprecedented popularity. He also found that some professors enjoy the challenge of teaching a technically difficult course. Percival, supra note 9, at 9, 30.
\textsuperscript{20} Sax, supra note 12, at 10,251.
\textsuperscript{21} Percival, supra note 9, at 9, 30.
\textsuperscript{22} By "environmental law system", I mean the governmental bodies and bodies of law that control environmental law. The relevant governmental bodies are Congress, the federal administrative agencies, including the Environmental Protection Agency ("EPA"), that administer the statutes and create and implement the corresponding regulations, state legislatures and agencies, local agencies and legislative bodies and hearing boards at all levels and federal and state courts. The applicable bodies of law include all of the laws and interpretive documents that would control an environmental law issue: statutes, regulations, permits, legislative history, agency guidance documents, settlement agreements, etc. In addition, students should have some exposure to the mainstream and other environmental groups that play a role in the making of environmental policy.
factual environmental problems. This environmental law system approach is preferable to focusing, as many environmental courses do, on many of the major federal environmental statutes at a superficial level. By studying the environmental law system vertically, students will acquire skills that are transferable within environmental law to any environmental law statute or to any other area of law.

In this first part, I advocated devoting increased attention to teaching the skills of statutory and regulatory analysis in an environmental law context. Part II considers the objectives and goals environmental law faculty may have in teaching their courses. Part III considers options for the placement of environmental law courses within the overall law curriculum. Part IV bears in mind the goals, objectives and options considered in Parts II and III and describes innovative teaching methods faculty have used in environmental law contexts. As such, it encourages a greater reliance on teaching methods based on problem-orientation and case studies. Part V considers programs such as environmental skills labs, megacourses with environmental law content, internship/externship programs, in-house clinics and environmental law moot court competitions to teach practical skills outside of basic environmental law courses. Finally, Part VI describes an environmental law course I developed and taught at Cleveland State University, Cleveland-Marshall College of Law using a combination of the problem-oriented and case study approaches suggested and described in Parts IV and V respectively. Part VI highlights the successes and failures of my still-evolving approach, in an effort to assist and encourage environmental law educators in improving effectiveness in teaching.

II. OBJECTIVES IN TEACHING ENVIRONMENTAL LAW COURSES

Fundamental to a discussion of teaching methods for environmental law is an understanding of the varied goals environmental law professors seek to achieve. As with all law school courses, there are many ways to approach the teaching of environmental law. These goals are critical to the discussion and evaluation of methods to improve environmental law teaching and they have been fairly

Substances Control Act, PL 94-469, 16 U.S.C. §§ 2601-2692; and the Clean Air Act, PL 94-11, 42 U.S.C. §§ 7401-7671. These statutes are all administered by the Environmental Protection Agency, which has created many volumes of regulations for each of them.
unclear throughout the development of environmental law as a discipline. In considering these goals, I focus on three basic pedagogical inquiries. The first inquiry is whether the course seeks to teach the overall content of environmental law as a substantive discipline. I believe that at best, the instructor may try to provide access to a significant portion of the universe of environmental law. However, even that requires difficult and important choices with respect to coverage. According to Professor William Funk, "if anything other than a hop-skip-and-jump survey course is intended, either the tour of the universe must be substantially curtailed to only a few planets, or the tour replaced by a study of particle physics, relativity theory, and cosmology." In short, the point is that the universe of environmental law substance is too vast to cover in one course.

The second inquiry is whether the course's aim is to teach statutory and regulatory analysis, use of administrative law and policy materials, scientific and economic methodology, in addition to understanding cases in the context of statutory interpretation. If so, the instructor must again sacrifice substantive coverage in an uneasy balance with opportunities for students to learn skills.

The third inquiry is whether a single course should aim to teach the substantive discipline as well as practical skills. While this may seem the ideal mixture of goals, the possibility of achieving it is suspect. Basically, the question here is whether to concentrate on content, skills or both. Any discussion of a course's goals in environmental law reveals this classic pedagogical debate: skills versus substance. In the context of environmental law, however, this debate is largely academic because there is no practical way of providing a thorough overview of the substance of environmental law in a single basic environmental law course. Instead, a focus on skills alone would provide sufficient, and perhaps an even more useful and accessible introduction into the content of environmental law, and simultaneously teach useful skills to future environmental lawyers.

Even if an instructor's goal for the course is to prepare students to practice law generally, as opposed to practicing environmental law in particular, instructors need not be overly concerned with

25. Funk, supra note 24, at 205.
coverage of vast amounts of substantive material. A focus on skills and an introduction to the substance of environmental law will suffice.\textsuperscript{26} If the instructor seeks to prepare students to practice environmental law in particular, the professor still must provide instruction on skills, in addition to, or instead of comprehensive coverage of the subject's substance.

Teaching students to understand the system that created, controls and implements environmental laws should be of primary importance. A critical point in the teaching process for environmental law must be that students need to understand how to learn more about environmental law on their own. Whether they become environmental lawyers or practitioners in another legal discipline, students must understand where the laws come from and how they are structured, interpreted, administered and implemented. The most important offering environmental law courses can make is an understanding of the environmental law system,\textsuperscript{27} both in terms of substance and skills. These lessons are valuable to all future lawyers.

Regardless of the subject, students cannot and do not remember most of the substantive details they learn in law school courses. Therefore, it is most valuable for students to understand how environmental laws are structured and how they interact with regulations, state law, and administrative policy, guidance and decisions. By studying even one environmental statute in relative depth, students can learn how other environmental statutes work and will be able to apply this knowledge to another environmental statute as issues arise in practice. For example, if a student studies the Clean Air Act in depth, but not the Clean Water Act, she will have learned basic information about environmental permitting, the role of state


\textsuperscript{27} See supra note 22 and accompanying text.
and federal agencies, federal authorization of state programs and
the interaction of statutes and regulations. Although the student
will not know the substance of the Clean Water Act, she will have
learned the skills to use it. In this way, it is possible to introduce
students, and give them limited exposure to a statutory methodol-
ogy with scientific, administrative, regulatory and policy considera-
tions that they can carry with them and apply elsewhere in their ca-
reers.

III. OPTIONS FOR ENVIRONMENTAL LAW WITHIN THE LAW SCHOOL
CURRICULUM

Law schools typically offer environmental law as an upper-level
elective. However, law schools could choose to offer it as a first
year elective, or even as a first year required course.28 The methods
instructors choose for teaching environmental law can vary widely
according to where the course fits into the law school curriculum.29

A. Environmental Law in the First Year

There has been discussion and disagreement in the literature on
the question of whether an introductory course in environmental
law should be required for first-year students. Professor A. Dan
Tarlock has argued that the current first year focus on case analysis
and methodology risks allowing students to emerge from law
school without the substantive background necessary to function
usefully in contemporary or future society.30 Tarlock also believes
the "traditional Langdellian cluster of basic courses" should be ree-
valuated and that law students should be introduced to the broad
underpinnings of their specialties, such as environmental law, dur-
during their first year of legal education.31

Professor Joel Mintz disagrees. He has argued that the tradi-

28. In the early 1990s, the University of Richmond's Law School became the first to make
Environmental Law a required first year course. Steven Keeva, Environmental Law Takes Root,
29. For a discussion of the connection between pedagogical method and various models
for law courses within the curriculum, see James Eagar, The Right Tool for the Job: The Effective
31. Id. See also Joel Mintz, Teaching Environmental Law: Some Observations on Curriculum and
Materials, 33 J. LEGAL EDUC. 94, 97 (1983). This point assumes that the traditional courses
are still taught primarily through traditional common law methods. Although still mostly
true, this approach is changing in some areas, particularly contracts and civil procedure.
tional Langdellian approach is still the best method for imparting the legal reasoning skills, analytic, interpersonal and organizational skills necessary to all legal practice, including environmental law. He argues that because most students are not interested in environmental law as a specific field of legal practice, a required introductory course will not, as Tarlock argues, provide an introduction to the broad underpinnings of their specialty. Arguing against requiring a first year course in environmental law, Mintz states that if first year students are required to take environmental law, they could also be required to take courses in other substantive areas, such as taxation, antitrust or labor law, and there is not enough room in the curriculum for all of this. He finds it more sensible to require that first year students choose, in their second semester, from a collection of substantive courses.

In arguing that it should not be required in the first year, Mintz focuses only on the benefits of environmental law as a course on substantive material. However, environmental law has much more to offer than its substance alone. Environmental law can offer important exposure to a broad spectrum of legal skills because of the roles state and federal agencies, legislatures and courts play in its implementation.

Environmental law is arguably well-suited to the first year curriculum if taught in simplified form as an introduction to legal process. It provides all of the elements necessary to meet this challenge. This article maintains that faculty could use environmental law effectively, in the first year or elsewhere in the curriculum, for its substance, as a skills or process course with a substantive base, or both.

B. Environmental Law as a Course in Legal Process

What Mintz and Tarlock both overlook is that it is possible to require or offer a first-year course in environmental law without abandoning the traditional Langdellian cluster or even focusing on the substance of environmental law. To do so, it is probably best

32. Mintz, supra note 31, at 97. This may be because the "disconnect from real-life allows a concentration on the method, but in fact, the addition of statutes and regulations may improve skills preparation without losing the benefits of traditional courses." Id.
33. Id. at 98.
34. Id.
35. See discussion infra section III. B.
36. The University of Richmond's T.C. Williams Law School has included environmental
Methods for Teaching Environmental Law offered as a course in legal process.

A comprehensive course in legal process should provide students with an understanding of: 1) where laws come from; 2) how they are implemented; 3) how they are interpreted; and 4) how lawyers influence these processes. Students should learn that our legal system is made up of statutes, regulations, procedural rules, common law, and an array of interpretational methods. They must also learn how federal and state laws work in relation to one another and how citizens and other interest groups can influence each of the elements of the system.

Environmental law provides all of the necessary elements for a first year or upper level course on legal process. For schools interested in providing or requiring such a course, rather than attempting to introduce the diverse elements of our legal system within different substantive disciplines, an environmental law instructor could provide a comprehensive introduction to the American legal system using environmental law as the substantive base. Students might be more interested in the legal process course because of its substantive base than because of its goal of teaching legal process, but they would learn introductory lessons of the legal system along the way.

An environmental law instructor could teach a course in Legal Process and include all of the necessary legal process elements as well as some substantive coverage of environmental law. By exam-

law as a required first year course, in place of what used to be a second semester of property. T.C. Williams made this change on the grounds that the first year traditional curriculum was too focused on common law, which the school believes has been largely supplanted by statutes, especially in areas such as environmental law. Keeva, supra note 28, at 52. The methods instructors choose for teaching environmental law can vary widely according to where the course fits into the law school curriculum. Id. at 52.

37. While a law student at Columbia University, Nicholas Robinson, now an environmental law professor at Pace University, participated in a discussion group with prominent environmental and natural resources law professors. Robinson pointed out that "[he] th[ought] there [was a need to impress on the legal teaching profession not represented here that there is a role for some environmental law in all courses; so if you want to teach legal methods through an environmental course, fine." See Discussion in LAW AND THE ENVIRONMENT, supra note 16, at 357 (emphasis added).

38. At the AALS 1994 Annual Meeting Mini Workshop on Environmental Issues Across the Curriculum, Kathryn Heidt, a bankruptcy law professor at Wayne State University, noted that her students seemed more interested in bankruptcy law when she began talking about Superfund than they were at any other time in the course. She believes that students are generally interested in environmental issues because they see environmental issues as current, relevant, and practical.

39. As early as the early 1970s, the University of Michigan Law School's course on Legal Problems of Environmental Quality, although not a first year course on Legal Process, dealt
ining an environmental statute, students could gain exposure to legislation at either the state or federal level. They would begin to understand its complexity when asked to interpret specific provisions. When students discover they cannot get clarity on an issue merely by reading the statutory language, they would discover not only judicial decisions, but regulations, agency guidance and policy documents, legislative histories and other sources of interpretive information.

Faculty would instruct students on how to use case law to interpret statutory and regulatory provisions, and would begin to explore theories of statutory construction. In studying topics such as nuisance and standing, students would also gain exposure to common law both in its own right and as the historical foundation of environmental law.

Depending which statute[s] the instructor uses for the course, students would frequently learn about the state programs created under federal approval. Students would learn how, in the environmental law system, federal statutes dictate standards for approval of state programs. Students would have to understand a state program as well, and would realize that state agencies, as well as federal agencies, issue regulations and guidance documents and often are responsible for implementation of either their own or the federal environmental program.

C. Environmental Law in the Broader Curriculum

Many environmental law professors have complained that the traditional methods used in the first year do not adequately prepare students for the study of environmental law in their second or third years. To the extent that this is accurate, it is perhaps because the standard first year curriculum fails to provide a sufficient


40. The Clean Water Act, Clean Air Act and Resources Conservation and Recovery Act, for example, are federal statutes which delegate, upon EPA approval of state programs, authority of the states to administer their own (federally-approved) water, air and waste programs. Clean Water Act § 101(b), 33 U.S.C. § 1251(b); Clean Air Act § 101(a)(3), 42 U.S.C. § 7401(a)(3); RCRA § 3006, 42 U.S.C. § 6926.

41. This type of knowledge, that is, state and federal interaction, is exactly the type of understanding that employers find lacking in law graduates. See, AALS Panel discussion infra note 160.

42. Percival, supra note 9, at 37.
grounding for the complex statutory and regulatory subject matter in environmental law. Moreover, first-year courses in property, torts, contracts, civil procedure and criminal law seldom provide introduction to or experience in in-depth statutory analysis.\textsuperscript{35} They usually provide little exposure to complex statutory and regulatory systems such as those found in environmental law. Although some law schools are beginning to devote portions of first year courses on property or torts to environmental issues, most still fail to provide a sufficient statutory or regulatory foundation in any area for later study of environmental law.\textsuperscript{44}

Before addressing questions such as what will be taught or the best methods for teaching environmental law, we must ask how environmental law can fit into the law school curriculum. The general consensus among environmental law teachers seems to be that law schools should offer some sort of introductory course, in either one semester or two,\textsuperscript{45} followed by a broad array of upper level, environmental law subject specific courses.\textsuperscript{46} In particular, Mintz suggests that law schools offer an introductory course covering "core" aspects of the subject.\textsuperscript{47} He considers the National Environmental Policy Act and at least one or two of the other major federal environmental laws to represent a minimum "core" and believes instructors should cover the statutes, related cases, and regulations,

\textsuperscript{48} Clearly there are exceptions to these broad statements. Some professors do teach traditional first year core courses using methods other than the standard common law approach, thereby providing useful exposure to statutory construction.

\textsuperscript{49} Percival \textit{supra} note 9, at 37. Columbia Law School is a rare exception. It "devotes one-third of its first year course, '[Foundations of] the Regulatory State' to issues of environmental law." This first year course on the regulatory state uses environmental law substance to develop skills in statutory and regulatory interpretation. \textit{Id.}

\textsuperscript{50} According to a discussion at the mini-workshop on teaching environmental law at the 1994 AALS Annual Meeting, most law schools offer a single semester introductory course. There was, however, limited discussion of the benefits of expanding the course to two semesters. Although most law schools offer only one introductory environmental law course, George Washington University offers two versions of the introductory environmental law course. A three-credit daytime course is designed for students who intend to continue in George Washington's environmental law program. A two-credit night course is more like "environmental law for non-majors." Electronic mail communication from Elizabeth Glass Geltman, George Washington University National Law Center, Feb. 3, 1994.

\textsuperscript{51} Mintz, \textit{supra} note 31, at 98-99. This suggestion raises concerns regarding the financial resources of law schools as well as the personal resources of individual law students. I do not intend here to advocate elevating environmental law course offerings to a supreme position in the law school. Instead, I intend to illustrate the complexity of the subject and suggestions for comprehensive offerings much of which can be accomplished using adjuncts and interdisciplinary courses within the university.

\textsuperscript{52} \textit{Id.}
to provide a sufficient introduction.\textsuperscript{48}

Beyond the introductory course, Mintz argues that interested law students should have the opportunity to study more specialized areas of environmental law and policy, for example, environmental litigation, air pollution control, water pollution control, hazardous waste management, regulation of noise pollution or coastal zoning.\textsuperscript{49} Mintz notes that the mere fact that so many advanced courses are necessary for comprehensive treatment of the subject makes clear that the substance of environmental law has grown so abundant and detailed that even a cursory treatment of its elements is impossible in a single semester course.\textsuperscript{50}

Environmental law has been called "carcinogenic" because it is constantly growing, dividing and multiplying and would take over the entire law school curriculum if allowed to do so. Law schools can therefore improve environmental law curricula by admitting that they cannot provide a substantively comprehensive introduction to environmental law in one semester\textsuperscript{51} and by attempting to understand what the discipline has to offer in terms of general skills training.

\section*{IV. PEDAGOGICAL OPTIONS FOR TEACHING ENVIRONMENTAL LAW}

This part considers several teaching methodologies that may be used for teaching environmental law.\textsuperscript{52} The purpose of this discussion is to identify positive characteristics for use in fashioning more effective teaching methods. It begins by discussing traditional approaches to law teaching, in particular, environmental law teaching. Within the category of traditional approaches, I include

\textsuperscript{48} Id.

\textsuperscript{49} For a comprehensive look at the course offerings of AALS schools, see AALS Report, supra note 9, and Percival, supra note 9, at 7. See also, Mintz, supra note 31, at 99, n. 21. In addition, Mintz believes students interested in environmental law should take courses in administrative law, energy law, law and economics, and land-use regulation. Id. See infra Part IV.D. for a discussion of interdisciplinary study. See also, infra note 74 and accompanying text.

\textsuperscript{50} Mintz, supra note 31, at 99.

\textsuperscript{51} Some law schools have divided their survey or foundation course into two semesters. Although this makes it possible to cover a wider range of substantive material, it does not address the basic question of whether maximum coverage of substantive material is the best pedagogy. The benefit of covering substantive material in an introductory course, regardless of the amount covered, is that coverage can lay a foundation for a deeper, more practical environmental law learning experience in the upper-level years.

\textsuperscript{52} For a detailed overview of general pedagogical methods for teaching law school courses, see Eagar, supra note 29.
courses taught using the traditional Langdellian case method, courses focusing on the major federal environmental statutes, and courses in which the instructor uses variations on both of these methods. The section moves next to some innovative options, such as a semester-long case study, a change in focus from pollution law to natural resources law, a shift towards interdisciplinary efforts and a problem-oriented method.

A. The Traditional Approaches

Environmental law professors could continue to teach the subject as most law school courses are taught, through the traditional Langdellian case method. In most law school subjects, the Langdellian case method introduces students to the massive and ever-changing body of legal knowledge and precedent, and indoctrinates them into the thought process so central to the legal profession through the analysis of appellate opinions. However, as dis-

53. A review of the major environmental law texts establishes that, at least until recently, the case method was the dominant method for teaching the subject. See Frank P. Grad, Environmental Law (3d ed. 1995). Other major casebooks, although not as focused on the case method, use cases to teach the substance of the major federal statutes. See Roger W. Findley & Daniel A. Farber, Cases and Materials on Environmental Law (4th ed. 1995) (using cases to narrate the substance of the statutes). See Funk, supra note 24, at 209-13. John E. Bonine & Thomas O. McGarity, The Law of Environmental Protection-Cases, Legislation, Policies, and Readings (2d ed. 1992) (using judicial opinions to narrate the substance of statutes while including substantial legislative history and fodder for statutory and regulatory analysis.). See Funk, supra note 24, at 209-213. Peter S. Menell & Richard B. Stewart, Environmental Law and Policy (1994) (uses short problems to explore specific areas of environmental law). A few of the major texts use problems in the teaching of environmental law. See, e.g., Thomas J. Schoenbaum & Ronald H. Rosenberg, Environmental Policy and Law: Problems, Cases, and Readings (3d ed. 1996). Most of these do so with short problems geared to very specific points of law. This, I believe is a big step in the right direction, although I prefer using larger problems, or case studies, which present many environmental issues at once. Other major environmental law texts lack the context that problems provide, see, e.g., Elizabeth Glass Geltman, Modern Environmental Law: Policy and Practice (1995). This text has a federal statutory focus and a strong focus on policy. It uses very current cases but provides little context for its statutory or policy discussions. See also Zygmunt J.B. Plater et al., Environmental Law and Policy: Nature, Law and Society (1999). This text has good introductory materials on policy, good sections on common law, and statutory interplay and on state and federal interactions, but lacks the context that problems can provide. See also Frederick R. Anderson et al., Environmental Protection: Law and Policy (2d ed. 1992). This text is not as focused on statutes as many, is good on policy, but includes little on states' roles in environmental law and includes no use of problems, and therefore little context for statutory or policy analysis. See Funk, supra note 24, at 205-208.

cussed in Part I, the traditional case method has become a less effective pedagogical tool for teaching environmental law. Although many would criticize the case method for its inherent weaknesses, with respect to environmental law the case method's ineffectiveness is due partly to the constantly increasing statutory and regulatory focus of the subject.

Despite the Langdellian case method's inadequacies, it certainly has its place in an environmental law course. For example, it is useful for teaching foundational issues such as standing and nuisance, as well as the historical common law grounding of modern statutory environmental law. Thus, while there is a use for the common law approach, it is limited. In addition to its utility for teaching standing and nuisance, common law is also useful to teach students some tools of statutory interpretation, of which reference to case law is but one.

A second traditional method faculty use in teaching environmental law is to focus on the major federal environmental statutes. One problem inherent in a course that covers a large number of statutes is the "if this is Tuesday, it must be the Endangered Species Act" Syndrome. The major federal statutes provide for easy course organization and a fount of content. Understandably, professors want to cover a great deal of material. But this means moving through the major federal environmental laws, and perhaps a smattering of state law quickly. As such, coverage of any single

55. Note that the widely used Langdellian case method is commonly referred to as "traditional," but there are actually several ways to use cases as the base pedagogical method. See, Edmund M. Morgan, The Case Method, 4 J. LEGAL EDUC. 379, 383-84 (1952) (describing three different case methods).

56. See Edwin W. Patterson, The Case Method in Legal Education: Its Origins and Objectives, 4 J. LEGAL ED. 1 (1951). Patterson, generally a supporter of the case method, is highly critical of its inability to teach statutory interpretation. Id. at 23. See also, Myron Moskovitz, Beyond the Case Method: It's Time to Teach With Problems, 42 J. LEGAL EDUC. 241 (1992) (discussing the ability of the problem method to absorb and go beyond a pure case method in terms of its potential for teaching students legal analysis and practical skills).


58. See Funk, supra note 24, at 210.

59. At the AALS 1994 Annual Meeting in Orlando, environmental law professors came together in a session on Teaching Environmental Law. The group leader, Lackshman Guruswamy of the University of Tulsa, asked them what sort of coverage they were seeking.
statute is usually superficial, and therefore unretainable by students. Focusing on many statutes thus leaves students with little to take with them except a superficial view of the kinds of subjects covered by the environmental laws. Although students may have learned enough content to help them identify some environmental issues in practice, they have not learned the most valuable lesson: to understand how statutes work when coupled with accompanying regulations and administrative policies. Too often, students do not understand the relationships between federal and state statutes, between statutes and regulations or the roles of administrative agencies and the public. To provide students a sufficient introduction to substance as well as the necessary skills to understand the operations of what has become a complicated system of law, they must learn how statutes function in conjunction with other laws. This second method instead teaches statutes in a vacuum because it fails to demonstrate the interconnectedness of the environmental law system.

Many environmental law courses use case law primarily to teach the substance of the major federal environmental laws. Students prefer this method of learning about statutory materials to the dreaded alternative of reading the statute itself. But this avoidance behavior ignores important skill-building and encourages students to rely on an inappropriate and inadequate form of legal research, that is, relying on cases alone to interpret statutory language, rather than learning from regulations and/or proposed

The responses, although slightly mixed, were overwhelmingly in favor of coverage of large amounts of material in the introductory course. Although there was discussion on the point, and some faculty expressed a desire to cover fewer topics more deeply, the general consensus was that the introductory course should provide a comprehensive introduction to the major statutes of the discipline. Since the AALS Meeting, I have spoken to several environmental law professors about this issue. While most agree, in principle, that deeper treatment of fewer statutes is a better teaching method, they have resigned themselves to allow deeper treatment to occur in upper level courses, and thus continue to attempt to cover large amounts of statutory material in the introductory course. Conversations with Elizabeth Glass Geltman, of George Washington University, National Law Center, and Marc. R. Poirier, of Seton Hall University School of Law. Despite the concerns of environmental law faculty, however, the decision regarding the amount of coverage necessary in an introductory course lies, in part, with the faculty's decisions on how comprehensive an environment law curriculum a particular law school will offer. For those schools with a limited curriculum, many professors may believe that the foundation course should be comprehensive. In schools with a broader curriculum, faculty may feel more freedom to provide depth over coverage.

60. See Funk, supra note 24, at 210.
61. See infra Part VI and accompanying text.
rules and other documents of the administrative process. Because environmental law has become so heavily statutory and regulatory in nature, environmental law professors should focus less on traditional case method pedagogy and content of the many federal environmental laws. Instead, they should give greater attention to the various methods of analysis and interpretation of the statutes and regulations that make up the bulk of environmental law. This would have the benefit of both teaching students in a manner that actually patterns how the system works and also providing useful skills of statutory analysis, a necessity for practicing law.

B. A Semester Long Case Study

In response to students’ and law professors’ need for a more effective environmental law course, Professor Joseph Sax suggests two models. His first suggestion is a semester-long case study designed to help students cope with the environmental statutes, which he describes as numbingly complex. The course would be aimed at helping students understand how and why “the system” of environmental law has gone astray and “enable them to try their own hand at it when their time comes.”

As an example of how the semester long course would work, Sax uses an example from his own teaching experience, a case-study seminar on water pollution taught with Professor John Dwyer at the University of California at Berkeley, Boalt Hall. The course was an in-depth study of the local effort to control the discharge of toxic metals waste at the Chevron refinery in Richmond, California. Students were assigned several written exercises which required them to apply state and federal statutes, regulations, Environmental Protection Agency (“EPA”) guidance documents, California’s water basin plan and other relevant legal materials.

While following the progress of efforts at the Chevron refinery, students learned the history of the National Resources Defense Council’s (“NRDC”) efforts to get the EPA to regulate toxics effectively. Students also met the participants in the ongoing legal battles and negotiations regarding the Chevron plant. Participants in-

62. Sax, supra note 12, at 10,252.
63. See supra note 20 and accompanying text. Sax’s second suggestion, an argument for a change in focus in environmental law courses from pollution law to natural resources law, is discussed infra, at section IV.C.
64. Sax, supra note 12, at 10,252.
65. Id.
cluded Chevron's environmental lawyers, both in-house and outside counsel, lawyers from the various state agencies responsible for writing Chevron's permits, an NRDC lawyer, citizen activists and a state legislator who was introducing legislation on toxics control. This exposure to a real-life environmental event allowed students to see the system at work and to speak with the people involved in it. It provided a real-life look at environmental law in action, as well as first-hand experience reading and interpreting statutes, regulations and technical documents. In Sax's opinion, the course's practical detail allowed students to learn how the San Francisco Bay (the body of water affected by the Chevron refinery) fits into the watershed of the San Joaquin and Sacramento Rivers and how urban runoff leads to environmental degradation in the Bay.

Sax's course did not try to cover every substantive area of environmental law. Rather, it provided an in-depth, practical look at one area of environmental law. This can be an effective way to teach environmental law if we understand that the major environmental statutes are similar to one another in important respects. These statutes are technically complex and have voluminous and complicated regulations associated with them. They require an understanding of the relationships between federal and state agencies with respect to permitting and implementation issues. And, they tend to attract the involvement of community and business interests. In that light, an in-depth look at even one such law should provide students with the skills to manage the others.

C. A Change in Focus in Environmental Law Courses from Pollution Law to Natural Resources Law

Professor Sax's second suggestion for more successful environmental law teaching would shift the emphasis of the basic introductory course from pollution law to natural resources law. His suggestion is supported by survey responses he received from law professors who, unlike the majority of the survey respondents, were happy teaching environmental law and had shifted their focus as he now suggests.

Sax's suggestion also makes sense because environmental law

67. Id.
68. Id.
courses have historically been viewed as originating in natural resources law. Early environmental law teachers developed courses in environmental law by distinguishing them from the existing courses in natural resources law. They sought to support the distinction by characterizing natural resources law as a course on the exploitation of valuable resources while asserting that environmental law dealt with the preservation of resources. Some, disagreeing with the distinction, argue that environmental law gave a conceptual coherence to the subject of natural resources by breaking down the established curricular categories. It did so by focusing on waste and population—the areas that control human interaction with the environment. More recently, some have argued that the original nexus between environmental and natural resources law has disappeared because environmental law practice is now dominated by interpretation of a series of complex federal statutes.

Even if one assumes that the original nexus has been overshadowed by increased statutory content and complexity, a course in pollution control law would still have to be grounded in the policy decisions concerning the distribution, management and preservation of natural resources. Sax suggests that a course in natural resources law may again be a logical starting point for law students' foundation in environmental law. Although this may be histori-
cally and substantively sound, it cannot, without supplement, achieve the goals of teaching statutory skills.

D. Interdisciplinary Approaches

Early environmental law courses drew not only from natural resources law, but also from other courses in the law school curriculum. They contained material from courses in administrative law, property law, public health law and natural resources law. Because of the multi-disciplinary content of environmental law courses, law schools soon began reaching outside the law school and experimenting with using environmental law in interdisciplinary education. An interdisciplinary approach makes sense when one considers how environmental law cuts across disciplinary boundaries from the social, to the physical and natural sciences. And like all lawyers, environmental lawyers must learn to work closely with people in other disciplines to represent their clients effectively.

According to one commentator, “[p]ersons trained in one discipline with the ability to synthesize and apply the insights

75. Biblowit, supra note 69, at 152. Environmental law now more clearly comprises material from the broader law school curriculum. In addition to material from the related fields of land-use planning, energy law and public land management, environmental law incorporates aspects of international law, taxation, occupational health and safety, property, remedies, torts, constitutional law, criminal law, civil procedure and evidence. See also Mintz, supra note 31, at 96.

76. Irwin, supra note 39, at 281. A 1971 survey of American law schools by the Committee on Environmental Law of the International Union for Conservation of Nature and Natural Resources was the basis of Irwin’s article. According to Irwin’s analysis of the survey, one quarter of the schools relying were using environmental law for experiments with clinical or interdisciplinary approaches to legal education. At the time, Colorado Law School was experimenting with a Technology Evaluation Seminar in which faculty and students from the law school worked with students and faculty from the Engineering, Psychology, Political Science and Economics Departments, and then participated in a summer internship program in which they did research within an environmental law agency. Id. See also, James N. Corbridge, Jr. An Interdisciplinary Program for Law Students in the Environmental Field, in LAW AND THE ENVIRONMENT, supra note 16. At Notre Dame, the environmental law program was open both to law students and graduate students from other disciplines. For example, in one seminar, equal numbers of students from the schools of law, economics and engineering were asked to come up with a legal, technically workable and economically feasible solution to an actual water pollution control problem. Id.

77. Tarlock, supra 16, at 298.

78. Percival, supra note 9, at 36. Robert Percival received numerous responses from law professors supporting an interdisciplinary approach to environmental law teaching. According to Richard Merrill of the University of Virginia School of Law, “in most environmental law fields, lawyers don’t work only, or even chiefly, with other lawyers: they work with scientists and engineers. We ought to expose students to this reality in a coherent way.” Id.
of related fields are needed for future decision-making.  

Whether providing counseling advice, participating in litigation, or drafting legislation or regulations, environmental lawyers must work with professionals in other fields such as engineering, physics, biology, meteorology, medicine, chemistry or economics. Even to pose the proper issues for analysis, lawyers need an increased sophistication and heightened appreciation of the role of the social sciences, as well as other sciences. It is important that environmental lawyers learn to work with these and other professionals because environmental law problems can often be technical and complex, and require expertise not readily available elsewhere. Because of the importance of science and economics in environmental policy, many environmental law professors believe that future practitioners should be familiar with other disciplines.

One way to teach environmental law and to provide an opportunity for law students to work with future professionals in other disciplines, is to offer an interdisciplinary course on an environmental law subject. The skills students would acquire would be useful in environmental law and readily transferable to other disciplines. One example of this type of course, that originated in the mid-1970s, is Columbia Law School's course on The Legal Aspects of Noise Pollution. Engineering Professor Cyril M. Harris, and Law Professor Albert J. Rosenthal collaborated on this course that

79. Tarlock, supra note 16.
81. Tarlock, supra note 16, at 299.
82. Percival, supra note 9, at 36. I note that these same interdisciplinary needs apply to lawyers practicing in other areas of law as well. For example, a products liability lawyer must learn to work and communicate with, for example, chemists, physicists, electricians, product design engineers, accident reconstructionists and medical experts.
83. My focus here is on the Harris and Rosenthal interdisciplinary noise pollution course at Columbia Law School in part because there are no other examples of interdisciplinary environmental law courses explained in any depth in the literature. However, professors at other schools have developed interdisciplinary courses in environmental law. For example, at the University of Washington, William Rodgers teaches a seminar on law and biology, the University of Florida offers a joint seminar on Florida ecosystems, through the law school and Biology Department, and the University of Maryland School of Law offers an interdisciplinary seminar on lead poisoning. Percival, supra note 9, at 37.
84. See Harris and Rosenthal, supra note 80. Some may argue that noise pollution is not an environmental issue because it does not deal with the preservation or distribution of natural resources. I argue, however, that noise pollution is, in fact, an environmental issue as evidenced by its inclusions in the environmental review processes required under the National Environmental Policy Act (42 U.S.C. §§ 4321-4370) and the state versions of the same ("little NEPAs").
brought together members of their respective disciplines. They required no prerequisites, although some of the law students had an engineering background or a course in environmental law and some of the engineering students had taken a course in acoustics. After covering sufficient fundamentals of noise pollution law and related engineering, students were assigned in groups, including both law and engineering students, to work on a project. The focus and form of the project varied over several years, but the main objective was always to provide opportunities for students to work together on a practical, real-life problem with students of the other discipline.  

In addition to offering interdisciplinary courses, some schools have experimented with full-blown interdisciplinary programs. For example, at Yale the law school has established a tie with the School of Forestry, at Michigan with the School of Natural Resources, and at Boalt Hall, with the School of Public Policy.  

Despite the desirability and relative success of some interdisciplinary environmental law programs and courses, many professors are discouraged about the prospects of providing such opportunities at their law schools and see law schools as barriers to interdisciplinary

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85. Harris and Rosenthal, supra note 80, at 131-33. The projects used in the course in various years have included a study of a nearby noise source, for example, subway noise, truck traffic on a nearby street or building construction noise. On these projects the teams of students go out to the site with a sound level meter to record and measure noise levels. They evaluate the data against available law and determine whether a violation has occurred and what, if anything, could be done about it. In some cases, students have recommended and written appropriate changes in the law or regulations. Another problem used in the course was an analysis of proposed legislation. Again, this is the type of problem a lawyer would face in practice for which he or she would require the assistance of, in this case, an engineer. For the course, teams of law and engineering students were asked to analyze New York City's proposed Noise Control Code. They were required to provide written reports recommending improvements from any relevant standpoint, technical feasibility of the standards, enforceability of limitations, elimination of inconsistencies and loopholes, clarity in drafting, etc. A third project used was a mock trial in a noise case. The trials involved civil actions for penalties under the New York City Noise Control Code. Generally, the engineering students were required to take field measurements and be prepared to defend their methodology in court, do background research on any of the relevant technical issues and serve as expert witnesses for both sides. One trial dealt with noisy air compressors in the digging of a subway tunnel, another dealt with noisy buses. Id.

86. Percival, supra note 9, at 56. In addition to these close connection relationships, many law schools offer students the possibility of enrolling in a joint degree program with another school within the university. For example, at Indiana, students are jointly enrolled in the law school and the School of Public and Environmental Affairs. At Tulane, students may enroll in environmental specialty programs at the School of Business and the School of Public Health.
education. Some reasons for this institutional barrier are that law schools tend to be isolated within the university community. Also, academic calendars of colleges within the same university often vary, and law schools are sometimes unwilling to give credit for courses outside their school either to professors for teaching them or to students for taking them. If law schools would eliminate or reduce these barriers and offer interdisciplinary courses or programs, they would do a great service to students, teachers and clients of environmental lawyers.

E. Problem-Oriented Approaches

Many law school faculty and practitioners have suggested that a shift in teaching method from Langdellian appellate case analysis to a problem method would serve students well. The problem is particularly well-suited to highly statutory and regulatory areas of law. Therefore, some law professors are using problem-oriented approaches to teaching environmental law. Under this approach, the professor provides real-life scenarios that a corporation, government or other potential client might face. In doing so, the professor provides a realistic framework within which the student can learn not only what the law is, but how it works.

87. Id. According to Percival's study, one professor, Michael Baram of Boston University, explained that law schools provide a barrier, not a support for interdisciplinary education because the "culture of law schools is so formalized and rule-bound".
88. Id.
89. Id.
91. Ogden, supra note 90, at 657-58.
92. At the AALS 1994 Annual Meeting in Orlando Florida, Professor Lackshman D. Guruswamy of the University of Tulsa College of Law discussed his use of a problem-oriented approach to teaching environmental law. The general consensus in the room, a collection of AALS professors attending a "break-out" session on "Teaching Environmental Law", was that a problem-oriented approach was a good way to teach students how to use the environmental laws, but that it was an inordinate amount of work for the professors.

One of my colleagues, Professor Steve Werber, agreed that in some courses it is far more time consuming to provide proper instruction than in others. This certainly is true for a problem-oriented or case study course in environmental law. Professor Werber notes that deans, law schools, the ABA and others all evaluate teaching load by the number of classroom hours a course provides. He suggests a reevaluation of this process, in which additional teaching credit for faculty accompanies courses which require substantially more work.
A professor might, for example, assign students the task of advising a corporate client on what to do with a particular type and amount of hazardous waste that is a by-product of the waste stream at a production facility. Students would learn to read the relevant statutory material, as well as the applicable regulations and permit conditions. Professors could teach environmental law, even at a fairly elementary level, by providing such problems for students to solve. In this model, the professor could assist students by providing step-by-step guidance as the class works through the problems. The class could explore as many or as few areas of environmental law as the professor deems appropriate, but the type of learning would be practical, in-depth, intellectually accessible, retainable and transferable.

In an introductory course in environmental law, the professor could assign a group of students the project of identifying and analyzing all of the potential issues applicable to a described facility, or all of the conditions an agency might attach to a permit. In a seminar on the Clean Air Act, for example, a professor might ask the class to write a guide to air compliance for a waste burning incinerator. The problem method has many positive characteristics. It teaches legal reasoning through issue recognition and analysis, strategy, procedures and synthesis. It allows students to find their own answers to legal problems, and it requires students to use more advanced skills than the case method. However, it is difficult to use with large classes and is labor intensive for faculty.

V. TEACHING SKILLS OUTSIDE THE BASIC ENVIRONMENTAL LAW COURSE

There are many good options for teaching students the legal skills necessary to practice environmental law while also teaching some of the substance of the discipline. By using a problem-oriented approach to course work, as introduced in Part IV.E and to be discussed in greater depth in Part VI, environmental law faculty can provide students with real-world problems and the skills

93. For a detailed description of a semester-long environmental law course using a problem-oriented method, see Part VI, below.
94. Ogden, supra note 90, at 658-659.
95. Moskovitz, supra note 56, at 246.
96. Ogden, supra note 90, at 658-659.
97. Id. at 664-65.
necessary to solve them. The semester-long case study also provides some of these same benefits. One drawback of both the problem-oriented and case study approaches to teaching is that they impose a considerable effort upon those teaching them.\textsuperscript{98}

In addition to the various methods available for teaching legal skills within basic environmental law courses, many law schools offer students opportunities outside of their basic environmental law classes in which to gain practical environmental law experience. Schools provide these opportunities do so through skills labs, a megacourse with environmental law content, in-house environmental law clinics, externship or internship programs, or through environmental law moot court competitions.

A. Supplementing A Basic Environmental Law Course With A Skills Lab

In an effort to promote active, skills-based learning, some faculty at Gonzaga University School of Law are using “Skills Labs” as supplements to regular law school courses. The idea is that skills labs operate somewhat like lab sections that often accompany science courses. Students enrolled in a classroom course have the option of also enrolling in the related skills lab. One of the courses with an optional skills lab supplement is Environmental Law. The environmental law skills lab is open to students who are either enrolled in the basic environmental law course or have already taken it.\textsuperscript{99}

Students enrolled in this lab study and practice lawyering skills that apply in environmental disputes. These include client and witness interviewing, selecting and working with experts, negotiating and working with an administrative agency, and trial advocacy.\textsuperscript{100} Although the factual setting of the lab exercise will vary from year to year, in its initial run it concentrated on an issue of local concern in the Spokane, Washington area—grass burning and its impact on air quality.\textsuperscript{101}

\textsuperscript{98} See supra note 92.

\textsuperscript{99} Telephone Conversation with Professor Gerald F. Hess, Gonzaga University School of Law, June 24, 1997. In its initial run, the Environmental Skills Lab had 13 students enrolled, of which 5 were concurrently taking the basic environmental law course. Eight students had taken a basic environmental law course in the past. \textit{Id.}

\textsuperscript{100} Preliminary FIPSE Grant Proposal Submitted by Gonzaga University School of Law to the U.S. Department of Education, Oct. 15, 1996 (hereinafter “Gonzaga Grant Proposal”). FIPSE is the U.S. Department of Education’s Fund for the Improvement of Postsecondary Education.

\textsuperscript{101} Gonzaga Grant Proposal, supra note 100.
The skills lab begins with teachers and guest speakers instructing the students on the basic principles of each of the skills addressed. Next, students practiced each skill by working with real parties, witnesses, experts, and regulators involved in the grass burning dispute at the time of the course. Last, the teachers and students provided feedback to the other members of the lab.

This course was designed to be a cost-effective way of bringing law students into contact with the lawyering work they will be performing following graduation. Goals include encouraging problem-solving and providing a context and theoretical knowledge base within which students could create solutions to legal problems. The skills lab achieves its goals cost-effectively because it is taught by an adjunct professor with considerable input from a regular faculty member.

However, faculty participating in the project have noted there are problems with using adjunct faculty. They are, for example, frequently unorganized, have time conflicts resulting from trials and other work, and have a tendency to tell “war stories” during class time that could be used for practicing skills. Another problem, specifically applicable to the skills lab in environmental law, is that it seems to emphasize litigation skills which, I believe, are already too large a part of the law school curriculum. For students interested in environmental law, a skills lab could usefully supply exposure to more administrative practice. This shift in emphasis would complement the litigation training students receive elsewhere in law school. For example, students could evaluate environmental impact statements, provide comments on proposed administrative rules, or negotiate with agencies with respect to permit conditions. Exposure to these processes and skills would be valuable to all future lawyers and especially to future environmental lawyers, including those who intend to practice environmental litigation.

102. Environmental Skills Lab Syllabus, provided by Professor Gerald F. Hess, Gonzaga University School of Law (hereinafter “Skills Lab Syllabus”).
103. Skills Lab Syllabus, supra note 102. This lab course, graded on a pass/fail basis, requires students to attend 12 of the 14 classroom hours, actively participate in each of the simulation exercises and complete a timely and satisfactory journal. Id.
104. Gonzaga Grant Proposal, supra note 100.
105. Id.
106. Id.
B. Teaching Environmental Law in a Simulation 'Megacourse'

In an attempt to provide significant practical experience in an environmental law context, four faculty at Case Western Reserve University School of Law collaborated on a two-semester, six-credit course that combined their areas of expertise. The large course included all of the material the faculty normally taught in their regular courses on State and Local Government, Environmental Law and Administrative Law. It also included portions of courses on Advanced Legal Research, International Law and Economics.

One goal of the course was to teach students to focus on the similarities presented in various types of environmental law problems. The instructors hoped to teach students that in addition to learning to understand statutory and regulatory law, they needed to pay attention to the interests and institutions at play in environmental controversies. They hoped students would see that there are often non-legal solutions to legal problems.

The course focused on two substantive environmental law topics, one in each of the two semesters. In the first semester, the course addressed Not In My Back Yard ('NIMBY') issues and in the second semester, Tragedy of the Commons issues. NIMBY issues deal with situations in which the benefits derived from an alleged harmful activity are widespread, but the burdens are narrowly concentrated on a particular community. Tragedy of the Commons is essentially the reverse, where the benefits of actions or decisions are individual, or very narrow, yet the burden is the depletion of a common resource.

To handle these broader environmental problems, the course used two simulation projects. The fall project concerned an administrative proceeding to site a low-level nuclear waste facility. For this project, the instructors obtained the actual 10,000 page administrative record of similar proceedings and edited them to approximately 2,000 pages for use as course materials. Students took on the roles of lawyers representing stakeholders in the proceedings. They represented the federal Bureau of Land Management, neighbors of the proposed site location, the contractor who

109. Id. at 224.
110. Id. at 225.
111. Id.
would be managing the site, the local water district, the state Department of Health and Human Services and a coalition of generators of low-level waste. In these roles, students prepared a memorandum to their clients outlining a proposed legal strategy, a prehearing brief and a posthearing brief. Finally, the students held a mock hearing.\textsuperscript{112}

In the second semester of the course, the project dealt with a Remedial Action Program from the Great Lakes. Again, students represented stakeholders. The goal of this project was for the stakeholders to work together to develop a local ordinance dealing with pollution problems. For this project, students prepared and conducted a negotiation on the content of the ordinance.\textsuperscript{113}

To prepare students for their roles in the problems, the teachers of this course presented lectures in their areas of expertise. Their hope was that the simulations would give students opportunities to apply the substantive knowledge they gained in the lectures.\textsuperscript{114}

The teachers of this course concluded that simulation was a successful method for teaching environmental law. Their stated reasons included the ability to get full and real administrative records and to grade students' efforts. The benefits students received were an appreciation for the interaction of facts and law, some grounding for theory, and opportunities to practice research, writing and advocacy in more sophisticated settings than they received as first year students.\textsuperscript{115}

The teachers of this megacourse took on a difficult task,\textsuperscript{116} to fuse areas of law in an academic setting where those areas fuse naturally in the real world. They offered students opportunities to see environmental law and many related areas of law in action, if only in simulation. For students interested in becoming environmental lawyers, the course was ideally suited to showing them two examples of what environmental lawyers might do in practice. For other students, they had opportunities to see the worlds of environmental law, administrative law, state and local government, economics and international law work together. From this, students

\textsuperscript{112} Id. at 226.
\textsuperscript{113} Id.
\textsuperscript{114} Id.
\textsuperscript{115} Id. at 238.
\textsuperscript{116} The enormity of putting on this type of course would be a serious deterrent for many faculty and law school administrators. To do it, Case Western Reserve had to assign four teachers to this two-semester course that enrolled approximately 20 students, an enormous commitment of resources. Id. at 237.
should see that seemingly distinct areas of law can also fuse outside of environmental law context.

C. In-House Environmental Law Clinics

In his survey of environmental law programs, Professor Joel Mintz cited six schools whose catalogs offered an environmental clinical course.\(^\text{117}\) He notes that “well managed environmental law clinics have the potential to stimulate student enthusiasm, expose law students to the often challenging world of environmental law practice, and bring home the concrete applications to which the student’s academic learning can be put.”\(^\text{118}\) In recent years many AALS law schools, agreeing with that principle, have established environmental law clinics. There are now, at minimum nineteen law schools with clinics devoted, at least in large part, to environmental law.\(^\text{119}\) Students at other law schools have expressed interest

117. Mintz, supra note 31, at 100. Although Mintz seems to consider externship and clinical programs to be one and the same, there are important differences. Internship and externship programs involve the placement of students outside the law school in government agencies, courts, law firms or citizen groups to gain practical experience in the field. Such programs usually include supervision by attorneys or others at the student's placement and sometimes are offered in conjunction with a required seminar or independent supervision by a law professor. Clinical programs, however, provide an in-law school opportunity for students to work with clients and assist with legal work under the supervision of law school clinical faculty and outside attorneys brought in by the law school to work with the clinic. Clinics usually provide useful legal services to the nearby community.

118. Id.

119. According to Robert Percival's study, 14 law school catalogs mentioned environmental law clinics, including those of Lewis & Clark College, Golden Gate, Hofstra, Loyola Marymount, Tulane, Widener and Yale Universities and the Universities of Maine, Maryland, Michigan, San Diego and San Francisco. Percival, supra note 9, at 34. However, according the 1996 AALS Clinical Section Directory, there are fifteen schools operating in-house environmental law clinics. Those law schools are at Golden Gate University, Pace University, University of California-Davis, University of California-Berkeley, City University of New York - Queens College, Georgetown University, the University of Michigan, University of San Diego, Rutgers-Newark, Tulane University, Washington & Lee University, Widener University, and SUNY Buffalo. In addition to those schools operating internal environmental law clinics, five schools indicated that they offer external clinics: Golden Gate University, Hofstra University, the University of Oregon, the University of California-Davis and the University of Montana. AALS Section on Clinical Education 1996 Directory, page 122. The AALS Directory does not include several schools listed in the Percival study, as well as several schools well known for their environmental law programs. One reason for these omissions may be that the AALS Section on Clinical Education Directory is based on self-reported information by the member law schools. Schools notably absent from the AALS Directory are the University of Maryland and Vermont Law School. In addition to the environmental law clinics referenced above, there are environmental law clinics in some form at Denver University School of Law, New York University, the University of Oregon, the University of Richmond's Thurgood Marshall School of Law and Cleveland State University.
in the establishment of environmental law clinics and some of those schools have begun expressing interest in their creation.  

New environmental law clinics are opening up all the time—environmental law clinics were recently established at the University of California, Boalt Hall School of Law and Golden Gate University School of Law. Boalt Hall's clinic, which is one of the first in California to offer free assistance to citizens and citizen groups with environmental concerns, is staffed by six third-year law students under the supervision of a full-time attorney. The clinic's goal is to provide assistance to citizens and community groups on environmental law issues such as toxic waste sites, harmful lead paint in buildings, and contaminated water supplies. The clinic emphasizes issues of environmental justice and equity.

Each environmental law clinic enrolls anywhere from three to fourteen students each semester. Most are neither taught nor supervised on a daily basis by tenure-track law faculty. Rather, clinical faculty, contract professors, or outside attorneys with no role in law school governance typically run and supervise environmental law clinics.

120. Percival, supra note 9, at 34.
121. Gretchen Kell, The Greening of Legal Aid, The Berkeley, The Environmental Law Community Clinic opened in Berkeley, California on Jan. 18, 1994. It was established, in part, by Prof. Joseph Sax. Note that the environmental law clinic at Boalt was not included in the Percival report, or the AALS Directory because it did not exist when those publications were created.
122. Id. The Clinic Director is Ms. Anne Simon, a former chief administrative law judge for the Massachusetts Department of Environmental Protection. Ms. Simon is also experienced in the areas of civil rights, international human rights, women's rights, family law and education. The clinic's focus on community environmental justice work attracted her to this new position. Id.
123. Id. In addition to the environmental justice clinics at Boalt and Golden Gate University, environmental justice clinics are now operating at Georgetown University Law Center, Boston College Law School, Thurgood Marshall School of Law, Stanford Law School and Tulane. Hope Babcock, Environmental Justice Clinics: Visible Models of Justice, 14 STAN. ENVTL. L.J. 3, at 6 n.10 (1995).
124. Pace University School of Law's environmental law clinic serves approximately eight or nine students each semester. Telephone Conversation with Steven Solow of Pace University School of Law (Feb. 15, 1994). Yale's serves six to eight, typically with more students participating in the Spring semesters. Telephone Conversations with J.L. Pottenger and Carol M. Rose, Yale Law School (Feb. 18, 1994).
125. Discussion of whether clinics should be supervised by regular tenure-track faculty, or whether clinical faculty should be tenure-track is beyond the scope of this article. I intend here only to report the current supervisory situation with respect to environmental law clinics.
126. The environmental law clinic at Yale, at least in its current form, is staffed primarily by two local attorneys brought in for the purpose of running the clinic. Regular law faculty
Despite the practical value of environmental clinical programs, many may not be providing a realistic picture of what it means to practice environmental law. Similar to internships, clinics tend to focus on litigation. Environmental law clinics, in particular, tend to focus on environmental citizen suits, which although clearly important within the realm of environmental law, are only part of environmental law practice. Because most environmental lawyers do only a small amount, if any, litigation, it would be useful for students who intend to be environmental lawyers to have significant exposure to compliance and regulatory work.

Environmental law clinics could provide services to non-profit organizations and start-up business in need of assistance with permitting issues. Clinics could also aid businesses in negotiations with state and local environmental agencies. Clinics could work on environmental compliance audits for area businesses and non-profits and could help citizens figure out, for example, the underground storage tank rules or other environmental law-based requirements. While performing these services, students would gain provide advice and assistance on clinical matters when necessary and requested. Telephone conversation with Professors J.L. Pottenger & Carol M. Rose, supra note 124; telephone conversation with Austin Carey of Yale Law School, during week of Feb. 15, 1994. The environmental law clinic at the University of Michigan is staffed primarily by adjunct faculty and is supervised by Mark Van Putten, a Clinical Professor of Law. Electronic-mail communication from Professor Paul Reingold, University of Michigan Law School. Pace University's environmental law clinic is supervised primarily by adjunct faculty on three year renewable contracts. Pace has not permanently funded the positions. Telephone call with Professor Steven Solow, supra note 124. At the environmental law clinic that existed from 1990-1992 at Washington & Lee University School of Law, Professor David Wirth, at the time a first year, tenure-track, environmental law professor, ran the clinic out of his office. His clinic was affiliated on a particular matter with a local non-profit citizen group with independent outside counsel but had little assistance from other faculty or outside attorneys. Telephone conversation with Professor David Wirth, Washington & Lee University School of Law (Feb. 21, 1994).

127. The environmental law clinics at, for example, Pace, Widener and Yale do primarily litigation or other adversarial work, both civil and administrative. At Pace, the clinic represents the Hudson Riverkeeper Fund, a private, non-profit, public interest organization serving as an ombudsman for the Hudson River and watershed. It is a litigation-oriented group, successor to the Hudson River Fisherman's Association, which initiated the Storm King litigation years ago. The students receive little or no exposure to permitting or compliance work. Telephone Conversation, Steven Solow, supra note 124. However, unlike the students at most environmental clinics, those that worked with David Wirth at Washington & Lee had an environmental law experience that ran the gamut of compliance and regulatory issues, as well as adversarial, citizen suit action experiences. Those students worked on Clean Air Act PSD permit issues, Clean Water Act, §404(b) permit issues, zoning and land use questions and issues concerning evaluation of environmental review documents. Telephone conversation with David Wirth, supra note 126.
broad exposure to environmental law and regulation in a way that provides a more realistic look at the practice of environmental law, and better prepares them to enter practice. 128

This article does not advocate doing away with the litigation aspects of environmental clinical work. The skills students learn in such clinics, and the experiences gained there are important and valuable. However, an additional focus on regulatory and compliance experience would serve the participating law students as well as the local community. It is certainly useful for law students to build litigation skills, and those skills are readily transferable to other disciplines of law. However, administrative law skills are also readily transferable, are essential to environmental lawyers, and are unfortunately de-emphasized in most law schools.

D. Externship/Internship Programs

Several law schools with extensive environmental law programs have opted for offering internship or externship programs so their students can obtain practical experience in environmental law outside of the law school. Notable among the schools making that choice are George Washington University and ITT-Chicago-Kent College of Law. Because of its proximity to federal government and environmental groups in Washington, D.C., George Washington offers substantive hands-on placements through which environmental law students may gain practical experience. Schools offering internship/externship programs rather than in-house clinics may believe that students get a more realistic picture of environmental law practice by working in government offices and other placements than by doing environmental litigation for citizen groups. Other faculties choose externship/internship programs over in-house clinics because of the wealth of opportunities available in the area in which they are located. 129 Some make this decision, at least in part, because the area in which they are located al-

128. All of the students who participated in the Washington and Lee environmental law clinic went into the practice of environmental law upon graduation. Professor Wirth feels that exposure to a broader experience in environmental law beyond a pure litigation focus will help them in their practice. Telephone conversation, David Wirth, supra note 126.

129. Faculty at both George Washington and The University of California-Hastings indicated that the decision to operate an externship program was supported by the location of the law school in a city with a wealth of placement options. Electronic mail communication from Elizabeth Glass Geltman, supra note 45; Telephone conversation with Professor Brian Gray, (Feb. 24, 1994).
ready has substantial resources in environmental legal groups. Because of their relative low cost in hard dollars and in faculty time, externships, despite their downsides, are an attractive alternative to in-house clinics.

E. Environmental Law Moot Court Competitions

Since the late 1790s, law students have participated in moot court competitions as a significant component of their law school learning experience. Schools throughout the country now provide opportunities for students to practice legal skills in appellate advocacy and in environmental law through participation in two major national environmental law moot court competitions, one at Pace University School of Law, and the other at Chase College of Law, Northern Kentucky University. Of course, participation in moot court competitions in any substantive area can provide experience

130. Hastings College of the Law was already operating an in-house clinic focusing on the needs of the neighboring "Tenderloin" area of San Francisco. The Tenderloin is a poor urban area, the residents of which are more concerned with housing, employment and domestic issues than they are with environmental concerns. However, students at Hastings were strongly interested in a program offering practical environmental skills training. Because San Francisco enjoys the presence of a wealth of environmental groups, such as the Sierra Club Legal Defense Fund, the Natural Resources Defense Council, the Environmental Defense Fund and others, the faculty chose not to open an in-house clinic. In addition, San Francisco provides many placement opportunities for externships. Students are placed with EPA-Region IX, the California Attorney General's office, and other government agencies, as well as with the many environmental public interest groups. Telephone Conversation with Professor Brian Gray, supra note 129.


in appellate argument and as such is a positive learning experience for students. But for students interested in environmental law, participation in the specialized competitions has the added advantage of exposing them to the substantive base of the discipline.

At the Pace University competition, organizers provide background materials for appellate argument. In an effort to mirror actual environmental litigation, participants argue the positions of three parties rather than two. For example, in the 1998 competition, students argued a problem of interpretation of the Migratory Bird Treaty Act from the perspective of the United States, a timber company and a public interest environmental group. Both competitions select issues of current national significance in environmental law.

Similar to moot court competitions, the University of North Carolina and other schools have formed Environmental Negotiation Teams to take part in a national competition on negotiation. Although the format of the competition is similar to other negotiation competitions, the environmental law negotiation is unique in that it emphasizes the emotional and economic positions of the parties and the applicable and often changing regulations involved in environmental disputes. In recent years, the competition has dealt with issues of public land use and environmental racism.

By participating in any moot court competition, students learn about working in teams, preparing appellate briefs, thinking on their feet and appearing and speaking in public. Yet despite its obvious advantages, moot court competitions do have their critics. In particular, some argue that moot court competitions perpetuate law students' misconceptions that legal points and doctrine motivate judges' decisions, and that facts are largely irrelevant.

Some argue that despite efforts to create realistic appellate circumstances, most competitions lack the normal accouterments of an appellate record, making them unrealistic. Judge Alex Kozin-
ski has noted that moot court fails to live up to its potential in terms of job preparation and job attainment value.\textsuperscript{140}

This may be true. However, I argue that moot court, environmental or otherwise, provides positive learning experiences for students. When supplemented with other practice-oriented learning experiences which provide access and exposure to the administrative and regulatory aspects of environmental law, moot court can be part of an effective program for the preparation of environmental lawyers.

\textbf{VI. THE THEORY APPLIED: A PROBLEM-ORIENTED CASE-STUDY COURSE IN ENVIRONMENTAL LAW}

When I began teaching Environmental Law in January 1996, I did so with great enthusiasm and some trepidation. Based in part on the research I was doing for this article, and in part on my own experiences as a student and practitioner of environmental law,\textsuperscript{141} I knew I wanted to teach the course using a problem-oriented approach through a series of case studies. However, I had neither the time nor resources to develop that kind of course in time for my initial effort.

I reviewed the available case books and chose that which most suited my needs.\textsuperscript{142} Despite the many positive attributes of the text, I was frustrated by my inability to use it to teach the course according to the method I felt was most pedagogically sound. I was teaching in a manner that I criticized above, concentrating on the major federal statutes, relying too heavily on case law to develop statutory content and doing little with state law or agency roles in the environmental law system.\textsuperscript{143} Later in the semester, in reaction to this frustration, I applied to Cleveland State University's Center for Teaching Excellence's Teaching Enhancement Award ("TEA") program for a grant to create a new course.\textsuperscript{144}

\textsuperscript{140} Id.
\textsuperscript{141} I studied environmental law at the University of Wisconsin and Columbia Law Schools and practiced environmental law at the law firm of Pillsbury Madison & Sutro, San Francisco, CA and Washington, D.C.
\textsuperscript{142} I selected ROBERT PERCIVAL ET AL., ENVIRONMENTAL REGULATION, LAW, SCIENCE AND POLICY(1996).
\textsuperscript{143} Supra Part IV.A.
\textsuperscript{144} The Cleveland State University Teaching Enhancement Award program is administered through the University's Center for Teaching Excellence and provides funding to university faculty who seek to improve or create courses using innovations in teaching method
For the summer of 1996, I received a TEA grant to create a series of case studies for a problem-oriented environmental law course. In my grant application, I argued, as I argue above, that environmental law is a substantive area served particularly poorly by the study of appellate opinions. It is a technical, complicated form of administrative law grounded more in statutory language and regulatory interpretation than in either appellate opinions or common law. The law environmental lawyers use in practice only rarely stems from appellate opinions. More often, environmental lawyers interpret statutes and regulations at the federal and state levels using agency guidance documents, proposed and final administrative rules, the outcomes of administrative hearings and some appellate opinions. In addition, much of an environmental lawyer's practice revolves around offering advice concerning environmental compliance, an area not well served by the traditional pedagogy.

In response to these problems in the traditional pedagogy, I sought to develop a series case studies through which I could teach substantive environmental law, environmental law research and writing and interpretation of statutes and regulations. I hoped to use these problems to teach students to advise clients regarding environmental compliance and also to understand the importance of working with professionals in disciplines critical to an environmental law practice—such as engineers and chemists. In short, I planned to introduce students to the universe of environmental law substance, while teaching them skills of legal process.

I planned to begin the course by teaching students to evaluate fact situations for clients and determine what environmental legal problems exist at the client's site. In the process, I hoped students would learn the importance of communicating well with experts in other disciplines. In addition, I hoped students would learn some substantive law and get experience doing the research necessary to handle the various environmental legal questions raised. Finally, I wanted students to practice writing answers to those legal questions.

For the new environmental law course, I wrote three fact situations, or "cases", designed to represent "real-life" circumstances an environmental lawyer might face in practice. The students would

145. The cases are all based loosely on clients and problems I encountered in practice. I altered the facts in each problem to suit the substantive needs of the course and protect the identity of the clients, but mirrored real clients' circumstances in many respects. See Appen-
learn about environmental issues and environmental laws only as they arose out of our clients' circumstances. Students would learn to find and use law that applied to our clients' issues and apply that knowledge about the environmental law system, in the future, to environmental issues that did not happen to stem out of our facts.

Students used a book of federal environmental statutes and an anthology of law review article excerpts. In addition, the course materials included nearly 800 pages I compiled in the form of a readings book. This compilation included overviews of the major federal environmental statutes and of some state environmental law systems. It included the language of applicable state statutes, federal and state regulations, appellate court opinions, attorney general opinions, agency guidance documents and policy statements. Finally, I included newspaper and law review articles and other materials students would need to evaluate comprehensively the environmental legal issues presented in the case studies. I organized the readings around the case studies. With the exception of introductory materials on nuisance and standing, the materials included appellate court opinions only for understanding and interpreting statutes and regulations.

Because one goal in teaching law students to practice is to teach them to identify issues, we began each case study by identifying the potential environmental legal problems presented at the client's facility. My goal here was to teach students to identify issues on their own. We would later work on skills to help them find the law necessary to analyze the issues, determine what facts were critical to a resolution, and draw conclusions.

The first section of the materials focused on the first case study, an egg production facility called Egg World. Through Egg World, students identified environmental issues faced not only by an egg production facility but also by other types of agricultural clients. Issues presented in the Egg World facts included standing, nuisance, hazardous and solid waste regulation, the management of empty containers and underground storage tanks, stormwater run-off, control of particulate emissions, environmental crimes and environmental auditing.

146. The statute book was SELECTED ENVIRONMENTAL LAW STATUTES (West 1996-97). The anthology was AN ENVIRONMENTAL LAW ANTHOLOGY (Robert L. Fischman et al. eds., 1996).
147. See Egg World facts, Appendix B.
148. See Environmental Law Course Syllabus, Appendix A.
The next case study, Union Air Lines, concerned an airline maintenance facility at a major local airport. In this case, students focused on water law, specifically National Pollution Discharge Elimination System permits, non-point source discharges and wastewater pretreatment systems, hazardous waste storage and cleanup, and identification and control of hazardous air pollutants.

The last case study, "Rabbit Transit", concerned a local mass transit system considering expansion of its service area into a low-income minority neighborhood. Here, the class considered environmental policy, environmental assessment, endangered species as well as issues of environmental justice.

In a short final section not yet connected to the case studies, we discussed environmental cleanups and liability, urban sprawl and efforts to redevelop urban brownfields land.

Students completed two anonymously graded writing assignments in addition to a final examination. The first writing assignment, a legal memorandum, asked students to determine whether Egg World's chicken manure management practices constituted a nuisance, because of its odor, to landowners in a neighboring town. The second writing assignment, a group project for three to four students, required students to evaluate the compliance status of Egg World's underground fuel storage tanks and a large pile of fifty-five gallon drums that previously contained a variety of chemicals. This assignment was a group project so students would gain experience working in teams to solve a problem and produce a document.

The final examination was a take-home examination with two

149. See Union Air Lines facts, Appendix C.
150. See Environmental Law Course Syllabus, Appendix A.
151. See Rabbit Transit facts, Appendix D.
152. See Environmental Law Course Syllabus, Appendix A.
153. Id.
154. One of the students' most frequent criticisms of the course was their distaste for the group paper. They did not like the fact that all group members received the same grade for the project. They also did not like the fact that although they received substantial feedback on the paper, it was not individual or specific to the work that each of them put into the project. I explained that this is how documents are often produced in real law practice, that all are responsible for the final product and that what is important is the quality of the final product. They should be able to tell based on my comments how well they played their role in the project. Despite students' concerns, the group project will remain a part of this course, but I will endeavor to explain more clearly its significance and application to the real world.
graded questions. The first supplied new facts but was modeled after the case study analyses students had seen throughout the semester. It involved a facility quite different from those the students had seen in class, but asked them to apply the skills they had developed in the course. Students were to identify the environmental issues presented by the client in the question, isolate the critical facts and omissions in the facts, find and apply the appropriate statutes and/or regulations and any other necessary or appropriate cases, policies, guidance or other materials.

The second question asked students to write a piece of a draft regulation and discuss the process that draft would have to undergo before it could become a final rule. Throughout the semester, students had seen many regulations in proposed and final form and had discussed related processes and policies.

To help determine the success or failure of the course, the course materials and the teaching method, I asked students in an ungraded third question, to evaluate the new course materials and the problem-oriented approach and to make suggestions for improvements in the course and materials. Responses were over-

155. The text of Question 3 was as follows:

Your answer to this question will not be graded. On a separate sheet of paper, without your exam number or any other identifying information, please write as little as a paragraph and as much as a page in an answer to the following question. Your response to this question will be stored separately from the rest of the exam and will not be received by Professor Robertson until after grades are filed. Please take this question seriously, your answers could be important to future students and to Professor Robertson’s effort to learn as much as possible about the most effective ways to teach environmental law.

Environmental law is usually taught as a traditional law school course, in which the texts, or course materials, focus on cases and the major federal environmental statutes. There is little discussion of regulation or of state law. In the traditional courses, students learn a great deal about the content of individual federal environmental laws. This semester, rather than focus in great detail on the content of the major federal statutes, we focused on “real world” problems, in an attempt to give environmental law some context. This was done on the theory that it is more important to learn to identify and solve environmental legal problems than it is to learn the content of the major federal laws. The major federal statutes are constantly changing, and students tend not to retain information on the content of a statute. Working on this theory, this course should have taught you to be able to identify environmental legal problems, find the content of the law and use it.

Please give me your impressions of:

1. Professor Robertson’s choice in teaching a course focused on practical, problem-oriented learning of environmental law.
2. The effectiveness of the course materials in helping to achieve the goals of the course.
3. What suggestions do you have for making this course the best that it can be for fu-
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whelmingly positive with respect to the use of the mock client cases as foundations for learning the substance of environmental law. The vast majority of students reported that client circumstances gave them a better sense of how environmental issues could arise than they could have received from a standard case book. They also felt that the fact scenarios provided a foundation of applicability for interpreting statutes and regulations. They felt they had a client whose circumstances and issues they understood.

Most students also approved of using the new course materials instead of a traditional casebook. Although many found the reading materials overwhelming in volume and complexity, only one student voiced a preference for a standard casebook. Several students, complaining about the complexity of statutory and regulatory language, admitted they prefer learning about statutes and regulations by reading appellate court opinions that explain them. Rather than pouring through small print and complex language on their own, students admitted they preferred to read a clear, concise explanation of the statutory language written by a judge. Clearly, students have little experience reading statutory or regulatory language. They do not like it and many faculty do not make them work at it. The student comments on this point only strengthened my resolve to require close analysis of statutory and regulatory language, often without the benefit of interpreting opinions.

Although there is substantial room for improvement, I believe the course went well. Students from the new course seem to understand better than my previous students how environmental law works in practice. They were exposed to less information about the content of every major federal environmental statute than my prior students, but they seem to know better how to find and

156. There were fifty students in the course, forty three of whom answered the evaluation questions. All but one preferred the new materials to a standard case book. I believe students based their judgment with respect to preferring the new case study material on their past experiences with standard case books in other courses.

157. See supra note 156.

158. I base this conclusion on my observations of the relative quality and depth of understanding exhibited in students' comments, questions and discussions in class and on their performance on exams in my environmental law courses over the last two years. See Environmental Law Course Syllabus at Appendix A for information regarding coverage of cases and statutes.

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evaluate information and function as lawyers within the environmental law system.

As to the future of this environmental law course, I am currently working with Lexis-Nexis to create a Folio Views Infobase for the new materials.159 Once completed, students will be able to access and search the course materials on-line, by subject and word. They will be able to download the materials to their home computer hard drives or use it in the law library computer lab. They will be able to input their notes and thoughts, from class and readings, into the infobase without changing the underlying materials and create their own outlines and study materials using the course materials.

VII. CONCLUSION

Environmental law has grown both in student interest and in the number of attorneys practicing, but it is often taught in a way that is frustrating to law students, law professors, and also to those who employ new environmental lawyers.160 To teach environmental law more effectively professors must consider stepping back from the traditional case method approach which, although effective in many areas of law teaching, is not optimally effective for teaching a complex, statute-based discipline like environmental law.

Environmental law faculty should move towards courses employing teaching methods that allow students to experience the environmental law system from top to bottom, so they gain depth of understanding. Students should gain exposure not only to the text of the some of the major federal environmental law statutes but also to the regulations and the regulatory agencies which created them. Moreover, students should understand how courts and agencies use case law, legislative history and agency guidance documents to interpret statutory or regulatory language. Faculty can achieve this degree of depth by devising courses using prob-

159. I received another grant from Cleveland State University's Center for Teaching Excellence to implement my Folio Views Infobase plan for this course.

160. This frustration on the part of environmental law employers was clearly reflected by the panelists at the 1998 AALS Environmental Law Section Program: "Do We Practice What We Teach?" The panelists included a partner from the environmental law group at the law firm of Pillsbury Madison and Sutro, General Counsel of the Bay Area Air Quality Management District, Regional Counsel for the E.P.A. Region IX and the Legal Director of Communities for a Better Environment. All of the panelists voiced disappointment in the skills and knowledge base of their new hires, recent law school graduates.
lem-oriented methods and/or case studies which provide students with an opportunity to learn the environmental law system by solving real-world type environmental law problems. Ideally, law schools should offer these courses in an interdisciplinary context that would be of professional benefit to future environmental lawyers as well as to future engineers, chemists or other future professionals. Environmental law professors should focus on offering this type of course rather than one that provides a superficial overview of the major federal environmental statutes.

Finally, law schools should place greater emphasis on the teaching of practical skills in an environmental law context. Although some law schools currently offer valuable practical experiences in the form of internship/externship programs or in-house environmental law clinics, many do not. Even those that do might consider increasing the amount of environmental regulatory and compliance work to which students are exposed rather than concentrating solely on citizen suit and toxic tort litigation, which forms only a part of the practice of environmental law.

APPENDICES

A. Environmental Law Course Syllabus

This syllabus is a guide to the introductory course in Environmental Law. Because the speed with which we will cover material may vary, please use it only as a guide. We will cover material in the order indicated below. I will try to let you know each week how far I expect you to get in the reading for the following week.

Introduction
Excerpts from Rachel Carson, Silent Spring, 12-19 (1962)
A Fable for Tomorrow
The Obligation to Endure
The Issues Considered in Setting Regional Environmental Priorities
Agenda of “Unfinished Business” Identified by EPA
Executive Agencies with Environmental Responsibilities
Rose, Given-ness and Gift: Property and the Quest for Environmental Ethics (Anthology, pages 296-305)
Hardin, The Tragedy of the Commons (Anthology, pages 281-286)
D'Amato, *Do We Owe A Duty to Future Generations to Preserve the Global Environment?* (Anthology, pages 33-40)
Rodgers, *The Seven Wonders of Environmental Law: Origins and Morphology* (Anthology, pages 82-90)
Legislative Authorities Affecting the Life Cycle of a Chemical Environmental Law: A One Page Summary

Egg World

Introduction
Egg World facts

Standing
Sierra Club v. Morton
Stone, *Should Trees Have Standing?* (Anthology, pages 21-31)
Fisher v. Lowe
US. v. Students Challenging Regulatory Agency Procedure (SCRAP)

Common Law Roots of Environmental Law
Madison v. Ducktown Sulphur
Missouri v. Illinois and the Sanitary District of Chicago
Georgia v. Tennessee Copper Co.
Trail Smelter case
Illinois v. Milwaukee

Writing Assignment #1
Christensen v. Hilltop Sportsman Club, Inc.
Reeser v. Weaver Bros.
State v. Grillot
R.C. 3767.01, 3767.02, 3767.13, 3767.23
O.A.G. 87-097
Calabresi & Melamed, *Property Rules, Liability Rules and Inalienability: One View of the Cathedral*
Statutory and Constitutional Authority to Regulate
Ohio EPA Map
Ohio Administrative Law

Hazardous Waste Regulation and the Question of Acceptable Risk
42 U.S.C. § 6901
Hazardous Waste Overview
Structure of the Resource Conservation and Recovery Act
Summary of RCRA Subtitle C
Regulations Applicable to Hazardous Waste Generators and Treatment Storage and Disposal Facilities
RCRA Hazardous Waste Classifications
Characteristics That Identify a Waste as Hazardous
Identifying Hazardous Waste
A Capsule Summary of RCRA's Subtitle C
42 U.S.C. § 6921
42 U.S.C. § 6924
42 U.S.C. § 6925
42 U.S.C. § 6926
42 U.S.C. § 6929
O.A.C. 3745-51-02 through 3745-51-33
O.A.C. 3745-65-13
42 U.S.C. § 6921
42 U.S.C. § 6903
R.C. 3734.02(F)
American Mining Congress v. EPA (What wastes are hazardous?)
40 C.F.R. §§ 261.10, 261.11, 261.20-24, 261.32
Hazardous Waste Treatment Council v. EPA (Land Disposal of HW)
40 C.F.R. § 261.5
Excerpt from EPA RCRA Orientation Manual - Regulation Applicable to Treatment, Storage, and Disposal Facilities


**Solid Waste Management**
Overview of Nonhazardous Solid Waste Management
42 U.S.C. § 6941
42 U.S.C. § 6942
42 U.S.C. § 6947

**Empty Containers**
40 C.F.R. 261.7
OAC 3745-51-07

**Underground Storage Tanks (USTs)**
Regulatory Authority Under Ohio Law
Overview of Federal and State Law
42 U.S.C. § 6991 a-i
R.C. 3737.87
R.C. 3737.88
The UST Corrective Action Program

**Stormwater and Runoff- Clean Water Act**
Overview of the Clean Water Act
Major Provisions of the Clean Water Act
33 U.S.C. § 1311(a)
Control of Non-Point Sources
Ohio's Water Pollution Regulatory Scheme
Water Quality-Based Standards
33 U.S.C. § 1313
O.A.C. 3745-1-31 (Lake Erie Standards)
NPDES permits
Storm Water Regulation
O.A.C. 3745-33.
O.A.C. 3745-36-02
O.A.C. 3745-38
O.A.C. 1501:15-5
Penalties for Violation of Ohio's Water Laws
Air Pollution Control
Overview of the Clean Air Act
Major Provisions of the Clean Air Act
The Clean Air Act Today
42 U.S.C. § 7401
42 U.S.C. § 7408(a)
42 U.S.C. § 7409
42 U.S.C. § 7410
42 U.S.C. § 7411
42 U.S.C. § 7412
42 U.S.C. § 7472
42 U.S.C. § 7475
42 U.S.C. § 7502
Ohio’s Air Pollution Regulatory Scheme
Chevron v. NRDC (Bubble concept and Judicial Review of Agency Interpretation of Statutory Language)
40 C.F.R. § 52.1870 et seq. (Subpart KK) - Ohio SIP
OAC 3745-17-07 (Control of Visible Particulate Emissions from Stationary Sources
61 Fed. Reg. 20458 (Approval and Promulgation of Implementation Plans and Designation of Areas for Air Quality Planning Purposes; Ohio)
Summary of Penalties for Violation of Ohio’s Air Pollution Statutes

Environmental Crimes
R.C. 2901.23
R.C. 2901.24
R.C. 6111.04
R.C. 3734.11 through R.C. 3734.20
O.A.C. 3745-65-13 (see Hazardous Waste, above)
State v. Stirnkorb
“Water Pollution: Human Beings Not ‘Point Sources’ Under CWA, Court Says in Holding Man Not Criminally Liable”
“Water Pollution: Person Can Be ‘Point Source’ of Pollution, Federal Government Tells U.S. Supreme Court”
R.C. 3767.14 through R.C. 3767.17

Environmental Audit Protection
60 Fed. Reg. 66706 - Incentives for Self-Policing: Discharges,
Disclosure,Correction and Prevention of Violations
Brown, *Senate Passes Bill to Protect Businesses In Pollution Audit* (Plain Dealer, January 11, 1996)
Brown, *State Could Lose Control of Permits for Pollution* (Plain Dealer, April 30, 1996)

**Union Air Lines**

**Introduction**
Union Air Lines facts

**Water**
NPDES Permits (from Clean Water Act materials, above)
Nonpoint Source Discharges (from Clean Water Act materials, above)
Typical Combined Sewer Collection Network During a Storm
NY Times Article on Three Stages of Waste Treatment
Pretreatment Program (Ohio law)
33 U.S.C. § 1317
33 U.S.C. § 1329
33 U.S.C. § 1342
Wastewater Treatment Unit Exemption
Interstate migration of water pollution
EPA May Require Point Source Discharges to Comply with Downstream
State’s Water Quality Standards: Arkansas v. Oklahoma

**Air Pollution Control**
Swan Super Cleaners, Inc. v. Tyler
40 C.F.R. 63.320 Subpart M- National Perchloroethylene Air Emissions Standards for Dry Cleaning Facilities
OhioEPA Environment Guide for Ohio Dry Cleaners
Kortge, *Taken to the Cleaners*
OhioEPA Pollution Prevention in Painting and Coating Operations

**Rabbit Transit**

**Introduction**
Rabbit Transit facts
National Environmental Policy Act
42 U.S.C. § 4321
42 U.S.C. § 4331
42 U.S.C. § 4332
NEPA, The National Environmental Policy Act: A Mandatory Disclosure and Stop and Think Statute
Calvert Cliffs Coordinating Committee, Inc., v. US Atomic Energy Commission
Kleppe v. Sierra Club (Proposal, Similar, Connected, or Cumulative Actions)
Thomas v. Peterson

Environmental Justice
"Environmental Justice Guidance Lists Factors to Consider in NEPA Compliance"

Endangered Species Act
Northern Spotted Owl v. Hodel (listing decision)
Northern Spotted Owl v. Lujan (critical habitat determination)
The Spotted Owl Controversy and the God Squad
Endangered Species Committee, Application for Exemption by the Bureau of Land Management to Conduct 44 Timber Sales in Western Oregon

Extra Stuff
CERCLA
A Statutory System for Managing and Funding Environmental Remediation: CERCLA (Superfund)
U.S. v. Alcan
In re Bell

Brownfields
The Industrial Property Revitalization Act of 1994
Senate Reform Bill Could Lower Barriers to Brownfields Redevelopment, GAO Says (BNA Environment Reporter)
Nichols, Law May Give New Life to Brownfields (Plain Dealer, March 26, 1996)

Pages from the The Ohio Voluntary Action Program Web Site

B. Egg World

Background

Egg World was founded in 1953. The 345-acre property was a pig farm until the late 1940s, but when the current owner bought the land, he converted it into a state of the art egg production facility. Egg World now has 36 chicken houses holding 3 million birds. The hens at Egg World produce an average of 2.5 million eggs and 300 tons of manure each day. Also located at the main property are an egg processing plant, a feed mill, grain silos, wastewater settling ponds and other buildings used for producing egg products.

Egg World owns an additional property five miles north of the main property. Egg World runs a chicken hatchery on the north property. The hatchery keeps Egg World supplied with new laying hens as the older hens become less productive. Hens arrive at the main property from the hatchery when they are six months old, and are placed in hen houses, four to a cage.

When a hen lays an egg, the egg rolls onto a small conveyor belt in front of the cages and is carried to a vertically moving egg carrier. The carrier releases the egg onto a large conveyor belt, where it is picked up by a worker and placed on an egg flat, much like a large, topless egg carton. The egg flats are then transported by truck to the egg flat washing building. There, each egg is checked by employees and by a computer for cracks and dirt. Some eggs are automatically placed in cartons for storage and transportation to stores. The remaining eggs are transported to the egg processing plant.

There are 340 people employed at Egg World's two properties.

Processing Plant

The egg processing plant is located on the main property. Here, eggs are either washed and packaged, or broken and processed, depending on their size, shape, color and quality. Within the
processing plant are an egg washing room, a mixing room, a canning room, a mini-laboratory and a sanitizer room.

**Egg Washing Room**

The egg washing room uses a mixture of hot chlorinated water (sodium hydroxide and sodium hypochlorite) and a foamicide to wash the eggs. Eggs chosen for breaking are broken by machine and separated into whites and yolks in the egg breaking room. The broken shells are collected, centrifuged to remove excess liquid, and mixed with waste chicken manure. The manure and egg shell mixture is spread on a manure drying pad (see below). The liquid from the centrifuge process is discharged into floor drains, which are washed constantly with fresh water. When the machines in the processing plant are not operating, wash water is mixed with chlorine to disinfect them. The wash water is then discharged into the floor drains. Chlorinated steam from this process is vented to the atmosphere. After washing, eggs are coated with Arcoprime— a light natural mineral oil mixed with stabilizer and vitamin E—to preserve them.

**Mixing Room**

In the mixing room, eggs are mixed and blended in two large vats into various egg products. Egg products created there include salted yolks, sugared yolks, plain yolks and whole eggs. These products are used in prepared or processed foods, such as cake mixes and breakfast cereals. Egg products are pumped from the mixing vats to storage tanks, and then to separate tanks to be pasteurized. Two boilers provide the heat for pasteurizing. The boilers have heat input capacities of, respectively, 1.2 and 2.5 million BTUs per hour. Water used to clean the equipment and spilled egg mixtures is discharged to the floor drains.

**Canning Room**

In the canning room, egg products from the mixing room are filtered and loaded into plastic buckets for freezing and shipping. Spillage from the canning room is discharged to the floor drains.

**Mini-Laboratory**

The mini-lab tests eggs and egg products for content and quality. The three chemicals used in the mini-lab, acetone, triethylcitrate,
and potassium chromate, are transferred after use to the Quality Assurance ("QA") lab for reuse or disposal. There is no chemical disposal occurring from the mini-lab. Chemicals are transferred to the main quality control laboratory for disposal.

Sanitizer Room

The sanitizer room includes a paved, covered outdoor area, an enclosed room, and a boiler room. This area is used to sanitize truck tankers which haul egg products. A pumping operation sanitizes tanks and lines that cannot be disassembled for cleaning. There are four 220 gallon steel tanks which store a solution of chlorine, water, sanitizers and a salt brine mixture. The chlorine solution is made in a chlorine generator located in the open area outside the sanitizer room. The chlorine generator has no air emissions or waste stream. From the generator, the chlorine solution goes directly into the storage tanks in the sanitizer room. The steel tanks are surrounded by a cement curb to trap overflow. Overflow is directed to the floor drains. The tanks vent to the atmosphere.

Also in the sanitizer room are 55-gallon drums containing a water conditioner (Scalite), and a disinfectant (Pervad). These solutions are pumped through the system during the sanitizing process. Egg World returns most of the empty drums to the supplier, but the remainder are deposited on the drum pile behind the experimental chicken house (discussed below). Any wastewater generated in this area is discharged to the floor drains.

Near the chlorine generator are 55-gallon drums holding food-grade glycol for use in the heat exchange and pasteurizing process. The sanitizer area also contains a sand filter for filtering well water to be used in the processing plant. All solids, impurities and debris which are filtered out are automatically pumped to the wastewater settling ponds every four hours.

The sanitizer area also contains a boiler room housing two boilers and a loading dock. The main boiler has a capacity of 500,000 BTUs per hour, and the pasteurizing boiler has a capacity of 1.2 million BTUs per hour.

The Wastewater Drainage System

All wastewater generated by the egg processing plant is filtered through a large screen and drained into a six-foot deep pit. This
wastewater includes drainage from all floor drains and sinks. Excess material, such as feathers, that fails to pass through the screen filter is added to the manure and egg shell mixture and spread for drying on the manure drying pad. Wastewater that passes through the filter is pumped to a series of settling ponds.

The settling ponds are made of cement and were constructed in the 1970s. There are three tiered ponds, allowing wastewater to flow from one pond to the next. Egg shells and sludge settle to the bottom, and are eventually removed from the pond, blended with manure wastes, and spread on the manure drying pad. The ponds are cleaned and checked for cracks monthly. The wastewater from the lowest pond, from which most solid material has been removed, is sprinkled onto the adjacent hillside through a spray irrigation system.

_Egg Washing Building_

Also located on the main property is an egg washing building. Eggs are collected from the hen houses on large egg flats, and are then washed in an egg-flat washing machine, similar to a dishwasher. The water used for washing the eggs and flats is mixed with Dioklor and a foamicide, heated to 120°F by a 500,000 BTU boiler located behind the building. The mixture is drained from the machine through two grated drains leading to collection pits under the floor. The mixture is then pumped by a lift pump directly to the wastewater settling ponds.

Behind the building, there is a paved culvert which collects water runoff and guides it to a nearby creek bed. The runoff collected in this culvert includes stormwater as well as water used for washing the inside and outside of the hen houses.

_Stormwater and Runoff_

In addition to the paved culvert behind the Egg Washing Building (see above), several other unpaved culverts run throughout the main property. One leads to a lake located on the main property (see below). Other culverts lead to a nearby creek bed which leads to a river and eventually to Lake Erie. The culverts and the creek bed contain flowing water only in flood conditions. Under normal conditions, all liquid discharged to unpaved culverts is absorbed into the soil.

The small lake on the Egg World property collects stormwater
runoff from at least one ranch culvert. When full, the lake drains overflow into the creek bed, which flows through a nearby river to Lake Erie. To prevent the stagnant lake from becoming a breeding ground for flies and pests, Egg World installed aerators in the lake several years ago.

**Quality Assurance Laboratory**

The primary purpose of the Quality Assurance (QA) lab is to test eggs and egg products for quality and compliance with health standards. There are two sections of the lab. The microbiology section tests products for levels of various bacteria and other organisms. The chemistry section tests products and feed to ensure quality. The lab contains a Kjeldahl digestion stimulation machine used to test proteins in chicken feed. The machine vents small amounts of chemicals to the atmosphere. The lab also contains an ash oven also used to test feed. It too, vents to the atmosphere. Technicians in the QA lab use volatile chemicals under a hood which vents to the atmosphere. Small quantities of liquid hazardous wastes are generated in the QA lab. Biohazardous wastes are disposed of into 5-gallon containers. The containers are kept in the lab while Egg World hires a transporter for disposal. Some chemicals from the lab are diluted or neutralized before they are deposited into the containers. Containers holding raw materials are discarded in the trash. Beakers and other glassware are hand-washed and the rinseate is discharged to the sinks. The sinks and drains in the QA lab discharge to a septic leach field. No chemicals that are considered hazardous are disposed of into the lab sinks or drains.

**Egg Whites Drier Building**

The main property also houses an egg whites drier building. In this building, egg whites from the egg breaking room in the processing plant are fermented. Next, the eggs are pasteurized and transferred to the whites drier machine, which blows hot (600°F) air over the eggs and turns them into powder. A boiler supplying 2.5 million BTUs per hour provides power for the drier. The building also contains an ice builder which uses freon to make chilled water for use in the pasteurizer. Freon is periodically added to the ice builder. Approximately 1,000 pounds of freon is stored in the stockroom. Empty freon cylinders are transported off-site by
the freon supplier.

**Vehicle Maintenance**

Ranch trucks and other vehicles are cleaned in the vehicle maintenance area. The wastewater from this process is pumped to the settling ponds on the hill. This area generates two items of potential concern: used motor oil and used car and truck batteries. The used motor oil is stored in an above-ground 500 gallon tank until full, which is usually about six months. When the tank is full, the used oil is picked up and recycled by a registered hazardous waste hauler. Fewer than ten batteries per year are stored on-site pending pickup by Ohio Battery Corp.

**Feed Mill**

Chicken feed is mixed and stored at the feed mill on the main property. Several silos at the feed mill contain components such as animal fat and liquid methionine. Grain arrives at the feed mill by train and is carried, via an unenclosed conveyor belt system to the top of the silos. Although grain is stored in the silos, it is processed and turned into chicken feed in a mill. From the mill, small Egg World trucks carry it to the hen houses.

**Storage Drums**

Behind the experimental chicken house, there is a pile of approximately 100 drums, some of which are severely corroded. According to Egg World management, the pile has been there for several years and rests directly on the soil. Many of the drums originated from chemical supply companies such Diversy Wyandotte and Van Waters and Rogers. The drum labels indicate a variety of substances, including: natural egg and mineral oils, propylene glycol, motor oil, epoxy paint, sulfuric acid and an unidentified corrosive cleaning solvent.

**Manure**

Approximately 300 tons of manure are produced each day. The manure is continuously collected from the hen houses and spread on an outdoor drying pad, covering about 15 acres, the base of which consists of firmly packed soil. Manure from Egg World's nearby north property is also spread on the drying pad. Broken egg shells from the processing plant are mixed in and spread with
the manure. The mixture is spread over the drying pad for natural aeration, drying, heating by sunlight, and to dissipate odors and kill any fly larvae that might be present. Generally, there is 3-4 days worth of manure production on the drying pad at any one time. The dried manure is sold to local fertilizer companies for resale to local farmers as an organic alternative to chemical fertilizers. In summer, the smell from the drying pad is quite strong.

The City of Aroma is located approximately five miles from Egg World beyond a hillside ridge which forms the border of the main property. During prevailing winds, the City is downwind of the main property. Aroma citizens have periodically, and with increasing frequency, complained about the odor. The main sources of odor are the hen houses and the manure drying operations. There are typically more complaints about the odor in the summer. Although numerous complaints have been filed, no formal action has been taken by any agency.

Underground Storage Tanks (USTs)

There are two operational USTs on Egg World's main property. The fuel in these tanks is used to fuel vehicles for use on the two Egg World properties. The smaller of the tanks was installed in 1976, has a capacity of 1,000 gallons and is used to store super-unleaded gasoline. Egg World uses about 40,000 gallons per year (3,300/mo.) of super-unleaded gasoline. The larger tank was installed in 1979, has capacity of 6,000 gal. and stores diesel fuel. Egg World uses about 46,000 gallons per year (3,800/mo.) of diesel fuel.

Both tanks are constructed of steel and have cathodic protection, alarm monitors, leak detection and vapor recovery systems.

Composting

Roughly 200-500 birds die each week at Egg World. The dead birds are disposed of in a composting process included in the ranch's waste management plan. Animal composting is permitted as long as the animals are owned by the farm doing the composting, are composted on the farm, and the compost is used in the farm or on the fields of farmers who contract with the livestock farm.
Water Towers

The water used at Egg World for chicken watering, processing plant operations, and in the laboratories is drawn from three underground wells located on the Egg World property. Each well site has an associated chlorine gas treatment unit. Water is pumped from the wells at a rate of 400 gallons per minute. In addition, the main property has a water hookup from the Aroma City Water District for emergency use only. The depth to groundwater at the main property is approximately 700 - 800 feet.

C. Union Air Lines

Background

Union Air Lines operates a large airplane maintenance and operations facility at Cleveland Hopkins Airport. The Hopkins maintenance facility serves as Union’s midwest and east coast service center. Union regularly services planes that have been operating in the midwest or east coast regions at this facility. Over the course of a year, the Hopkins facility services 80% of Union’s airplane fleet. It is Union’s largest and most important service center, although the airline also runs maintenance facilities in the western United States (in San Francisco) and southern United States (in Houston).

At the Hopkins maintenance facility, Union cleans planes, repaints planes, removes and replaces plane interiors, cleans plane upholstery, fixes engines and other parts of its planes, and trains maintenance personnel. In the course of completing these tasks, the maintenance facility has had several encounters and ongoing negotiations with Ohio EPA, U.S. EPA, and Cleveland Hopkins Airport.

Airplane Washing

To keep the Union fleet looking good in the air, the Hopkins maintenance facility washes planes on a regular basis. To clean the planes, the maintenance facility uses a combination of water and cleansers. The cleansing solution is made specially for use on airplanes and is regulated by the U.S. EPA. The soap is phosphate free and water soluble. However, during the washing process, the water mixture takes on chemicals, oils and traces of paint and
heavy metals as it passes over the painted and metal surfaces of the airplane. The water mixture used in cleaning processes therefore travels via drains and pipes in the hanger floors to Union’s wastewater pretreatment plant on the maintenance facilities premises. The pretreatment plant separates waste products from water. Primarily, it is an oil-water separator. Union manifests the resulting waste sludge and disposes of it as hazardous waste.

**Painting**

The Hopkins maintenance facility is responsible for painting all of Union’s airplanes in the bold colors of Union’s new insignia. The paint used for this procedure is an oil-based paint specifically created for use on airplanes. This paint must withstand extreme temperature fluctuations, drastic weather changes and severe altitude changes.

Before painting the planes, workers at the maintenance facility must prepare the surfaces of the planes to receive the new paint. This usually means that the old paint must be removed and the surface treated. The facility uses halogenated organic solvents to remove old paint.

To paint the planes in an efficient manner, the facility uses high powered conventional spray painting machinery with templates for the Union insignia. Ohio EPA has been after the facility to curtail the VOC emissions resulting from its operation.

In addition to paint, the facility’s painting area stores many containers of solvents and paint thinners. The solvents are used for mixing and thinning the paint, and for cleaning up paint spills. As a result of the mixing of paints, cleaning of spills and painting of planes, paint fumes, in the form of VOCs are produced in this area and are vented to the atmosphere.

**Pretreatment Plant**

The wastewater pretreatment plant really consists of two systems. The first separates wastewater from oil products and the second treats the wastewater that remains after the oil has been separated out. The wastewater pretreatment facility receives wastewater that comes out of the oil-water separator and treats it to remove a limited amount of heavy metals and other hazardous pollutants. The plant does not attempt to meet any numerical standards with respect to its wastewater, except as required under its discharge
agreement with the Publically Owned Treatment Work ("POTW") at Hopkins Airport.

From the wastewater pretreatment system, the treated wastewater is discharged into the POTW at Cleveland Hopkins Airport. The Airport POTW treats the water under an NPDES permit, issued by Ohio EPA under authority of U.S. EPA, and discharges it to Lake Erie. The Airport’s NPDES permit imposes certain specific conditions on its discharge to Lake Erie, specifically, it regulates the amount of heavy metals that can remain in effluent discharged from the Airport facility. Consequently, the Airport POTW imposes conditions on the wastewater it will accept from the Union Air maintenance facility. The Airport POTW has a daily design flow of less than 5 million gallons. Seventy-five percent of Hopkins Airport’s industrial wastewater influent to its POTW is generated by the Union Air Lines maintenance facility. Despite Union’s efforts at pretreatment, the effluent from its pretreatment plant still contains relatively high levels of heavy metals. Regardless, Union’s effluent meets the current constituent limitations placed on it by the Hopkins POTW. However, the Hopkins POTW just received word from Ohio EPA that its NPDES permit conditions regarding heavy metals constituent limitations will be tightened significantly beginning January 1, 1998.

To bring Hopkins Airport’s POTW into compliance with the heavy metal effluents requirements of its NPDES permit, the POTW must make more stringent the constituent limitations placed on the Union facility’s effluent. As a result, Union must replace its entire pretreatment plant to improve the quality of heavy metal removal. To replace the pretreatment plant, Union must remove several tanks, including a pretreatment storage tank and pressure flotation unit. It must remove and replace the influent pump station and install new tanks.

**Upholstery Cleaning**

The Union Air Lines maintenance facility is also responsible for cleaning airplane upholstery. Accordingly, the facility has an in-house dry cleaning operation designed for the dry-cleaning of airplane upholstery. The dry cleaning operation is a transfer system involving different machines for the washing and drying of upholstery. This includes the passenger seats, seats in the cockpit and even the carpeting on the airplane floors and walls. The cleaning
process is similar to that of a typical dry-cleaner. To clean the upholstery, the facility uses a mixture of perchloroethylene ("PCE" or "perc"), which is a dry-side solvent, similar in consistency to gasoline, a waterproofing solution, soap, and a static-reducing agent. The fumes produced from this process are toxic, and can be harmful if inhaled. These fumes are vented to the atmosphere. In addition, harmful air emissions result from solvent spills, leaks from piping and escaped vapors when fabrics are transferred between machines in the various stages of the cleaning operation.

Wastewater from the dry cleaning operation drains, with the wastewater from the painting and other maintenance operations, to the wastewater pretreatment system. Like the other wastewater, it eventually flows through the Airport POTW to Lake Erie.

The dry cleaning operation generates a significant amount of spent solvents and surplus chemicals. It was originally installed in December 1991, uses approximately 100 gallons of perc per year and generates substantially less than 220 lbs. of hazardous waste per month.

D. Rabbit Transit

The Rabbit Transit Corporation ("RTC"), a regional transportation authority operates an extensive above and below ground train system to provide public transportation to a large metropolitan area. RTC would like to build an extension of its subway system through a local community. The purpose of this extension is to provide greater access to public transportation to people living in the outer suburbs and therefore to relieve pressure on the area’s roads.

The train system currently terminates in a community, Terminus, just southeast of the City. This community is a mixed-demographic and socioeconomic community. The community to the south of Terminus is the largely African-American City of Waterville. Waterville has a much lower average household income than the City of Terminus.

This large scale proposed project will require federal funding and several federal permits. In particular, this project qualified for funding from the Department of Transportation because it was designed to take pressure off the roads and encourage use of public transit.

To build the extension, the RTC will need the cooperation of
federal, state, and local agencies and governments and the local communities. RTC must purchase the land, get the rights of way, or have the appropriate bodies take the land by eminent domain to lay tracks for the extension and to build stations. Some of that land will be easy to get—some of it certainly will not. In fact, one large plot of land noted on the current extension plans is a park—Waterville Park. The tracks would have to be built over the small lake in that park, or they would have to be run underground to avoid it. It would cost twice as much to build the tracks below ground as above ground, and the RTC is therefore reluctant to consider that possibility.

Also, living in the lake at this park is a very rare creature—the Waterville Water Mole. There is something about the ecosystem in this small park that is ideal for the Waterville Water Mole.

The current plan includes building, on the edge of Waterville, a large parking structure for cars, and a maintenance terminal for trains.

Citizens and environmental groups have challenged this transit extension—but many have supported it as well—it has been THE controversial issue in the area. Mayors and city council members have lost elections over it—and friendly neighbors have become enemies.

The U.S. Department of Transportation has done an environmental assessment and has determined that although this is a major federal action, there is no threat of significant adverse environmental effect. The DOT therefore proposes not to do an environmental impact statement for the project.